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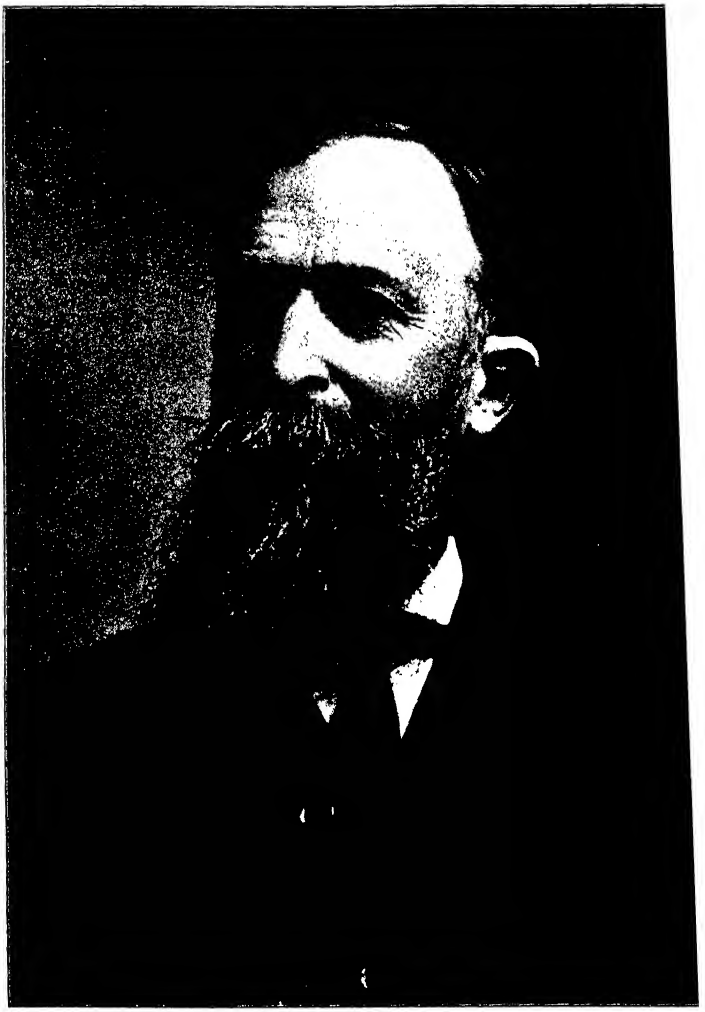

Yours truly,
J. H. Kellogg.

ENTERED AT STATIONERS' HALL

PREFACE

THE present age surpasses all others in its vast accumulations of wealth and knowledge. All preceding ages have contributed to the world's store of facts and of gold and other material possessions. Never before has the world witnessed such colossal aggregations of capital as at the present. Never was the storehouse of learning so filled as at the dawn of the twentieth century.

But with all this marvelous material growth, the world was never so needy as now. There are some things which learning does not give, and which money will not buy. The world's cry is for men,—men of brains, men of character, men possessed of common sense, men of ideas, of resource, of unconquerable pluck, of unswerving honesty. It has come to be a common proverb, "Every man has his price." There is an unlimited, unsupplied demand for men who are above price, who cannot be purchased, whose favor, whose vote, whose principles, are not for sale at any price.

Manly men, men who have convictions and courage to live up to them, are at a high premium. The present generation seems to be perceptibly poorer in men of this stamp than the preceding, and the rising generation is weaker still in this particular and to a lamentable extent.

To the minds of all serious and intelligent men, there is evident a pronounced decadence in moral stamina, as well as in physical endurance, in almost every civilized country. In this melancholy procession, France leads the way, while Spain, Germany, England, and the United States are rapidly following down the hill. Race decadence is manifested in a hundred ways. Here are a few of

the marks of the physical and moral dissolution which is steadily progressing wherever the depraving influence of our perverted modern life has established itself.

The rapid spread of tuberculosis, the "white plague" of civilized life; the growing frequency of insanity, which within half a century has increased three times as fast as the population, and at the present rate of development will in fifty years make the insane constitute one per cent of the total population, and at the same rate make the whole race insane in two centuries and a half; the death of half the children before five years of age; the rapid decrease in the number of centenarians in proportion to the whole population,—very aged persons being very rare in all countries except Ireland and Hungary, where simplicity of habits still prevails to a sufficient extent to hold in check the soul- and body-destroying influences which are hastening the race toward decrepitude and final extinction; the increase of nervous disorders of all sorts; the almost universal early decay of the teeth, a most positive evidence of physical decline; the growing disrespect for religion; the alarming increase of crime,—10,000 murders in the United States in a single year; these and scores of other sign-boards attest the downward direction in which the race is tending under the blaze of the brilliant achievements in knowledge and in the arts, in invention and discovery which have within the last century reached the very highest mark attained in the history of man.

The human race, even in the most civilized lands, where are afforded the greatest freedom and the best conditions for physical, mental, and moral health which any country offers, is going downward at a most appallingly rapid pace. And this deterioration is not simply physical, as shown by the number of physically weak individuals, but it is mental and moral as well. A few are recognizing these facts, and it is this recognition which is giving rise to the erection of gymnasia, the organization of gymnastic clubs, health associations, and various societies which have for their purpose the physical, mental, and moral improvement of the race; but unfortunately these influences affect but a very small percentage of the whole people. Probably not more than two or

three per cent of the entire population of any of our great cities are to any considerable extent benefited by the efforts which are thus made in behalf of the physical improvement of the individual.

What will be the condition of the world when society is entirely composed of degenerates, and when the whole lump of humanity is permeated with the leaven of physical, mental, and moral perversion?

How much time will be required for complete race extinction? No date can be set at which the last weazened specimen of the genius homo shall expire "without medical assistance" and "without benefit of clergy;" but the awful fact stares us in the face that we are going down at a rate which, unless materially diminished, will at a time not many centuries distant, bury the race in oblivion, and this rapid rate of decay is more likely to be accelerated than diminished, unless some new and powerful agency is set in operation whereby the downward progress shall be stayed.

Through the almost universal ignoring of the duty devolving upon every human being to preserve intact, as far as possible, the natural powers transmitted to him from his ancestors, and by training and painstaking development make the most of them, we find the human race deteriorating in physical stamina, and a rapidly growing multitude of "disinherited" individuals who are born into physical, mental, and moral bankruptcy. It is high time that society gave more serious attention to this great class of bankrupt by heredity, from which springs the greater share of crimes and criminals, cranks, lunatics, fanatics, and imbeciles.

Race deterioration will not cease until we again write over our sanctuaries of learning and of worship the motto the ancient Greeks carved above the portals of their temples, "A sound mind in a sound body." We must recognize as a solemn reality that religion includes the body, and that the laws which govern the healthful performance of the bodily functions are as much the laws of God as are those of the decalogue. So long as man regards his body as a harp of pleasure, to be played upon as long as its strings can be made to vibrate, so long will he continue to travel

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Man The Masterpiece

ON the time-stained walls of an antiquated church, in an obscure part of an old Italian city, hangs a canvas, painted by an artist whose ashes have been smoldering in the grave for centuries. Every year thousands of men and women from all Christendom make a pilgrimage to this shrine of art, and, as the monk draws aside the costly covering which protects it, reverentially speak the artist's name, and say, "That was his masterpiece."

The artist who is thus reverenced was but a man, and his work, wonderful as it is, is but the shadow of a human form. The artist himself was a work of art as infinitely superior as eternity is greater than a day. Man, the paragon of creation, is the crowning work of the divine Artist—the Creator's masterpiece.

A gold watch, with its carved or polished case, is a beautiful object to look upon; but it is only when the case is opened, exposing to view the delicate wheels and levers by which the hours and minutes are accurately measured off, that we begin to appreciate the wonderful ingenuity and skill displayed in this useful mechanism. So it is with the human body. Its beautiful and symmetrical exterior excites our admiration; but it is

only when we inspect in detail its intricate machinery, its various tissues, organs, and apparatus, and witness their marvelous processes, that we begin to appreciate the infinite skill and wisdom of the divine Artist who designed and executed this most wonderful of all created works.

The Secrets of Nature.—The human eye, when aided by all the other senses, is not able to discern the infinite delicacy of form and structure which pervades the entire human form; and it is only when that adroit revealer of nature's secrets, the microscope, is brought to bear upon each little thread of tissue in the body, that its infinite grace and beauty of structure and marvelous delicacy of form and composition are discovered.

A philosopher has said, "The proper study of mankind is man." For ages, many of the noblest men have devoted their lives to the study of the "human form divine," bringing to their aid every appliance afforded by the whole range of art and science, and applying themselves with untiring energy and patience to the effort of compelling nature to divulge at least a few of the secrets enshrouded in the mystery of human life. Every fiber of the human body has been subjected to the most searching scrutiny of microscopes so powerful as to make the finest grain of sand equal in apparent size to an enormous rock.

Each structure and organ has been named and carefully described; and to such a degree has knowledge on this point accumulated, it has become the work of a lifetime to become fully acquainted with the minute details of the body and its work. In this brief chapter, we can only glance at a few of the leading character-

living slime represents life in one of its lowest forms. Its substance is homogeneous. It really has no structure, yet it feeds, breathes, feels, and possesses, in a primitive form, most of the properties of living things in a higher stage of development.

If we follow the history of a human being back to the earliest moment of existence, we find only a little speck of living jelly, substantially like the live portion of a sponge. This living bit of jelly has no nerves, yet it feels; has no lungs, yet it breathes; no stomach, yet it digests; is without hands, yet it works.

The sponge was once a mere little drop of slime, which grew, and gathered in material from the surrounding waters, and from this material it built for itself a skeleton over which to extend and upon which to live. So the human jelly-drop works and grows and develops and builds cells, fibers, structures, and organs, till at last the human body, with all its wonderful details, is perfected.

The Bony Skeleton.—The body, like the house in which we live, requires a framework to give to it firmness and symmetry. This framework must be not only firm, but flexible, in order to enable us to use our bodies easily in the great variety of movements required of them. To meet this requirement, the skeleton is possessed of a large number of separate bones, two hundred in all, which are held together by bands, or ligaments, forming joints. In early infancy the bones are soft and flexible; but in adult life they become hard and rigid. In old age their composition is changed in such a way that they become brittle, and are easily broken.

The bones are not entirely matured until some years after the body ceases to grow in height, or about the age of twenty to twenty-five. During the years of development, the soft bones may be easily bent out of shape by bad positions in sleeping or sitting, or by improper clothing. It is in this way that curvatures of the spine, flat chests, round shoulders, narrow waists, and deformities of the feet are produced.

This flexibility of the bony framework of the body in early life clearly indicates the importance of training the body to a correct and symmetrical development. This point will receive particular emphasis in another chapter.

Muscles.—The beefsteak, smoked ham, or mutton-chop which you had for breakfast was a portion of the muscle of an ox or sheep. The lean meat of all animals is composed of muscular tissue, which also makes up the great bulk of the fleshy portion of our own bodies. A piece of lean meat that has been salted, after being boiled may be separated into bundles, each one of which may be divided into a large number of delicate threads. If one of these is placed under a microscope, it may be divided into fibers almost too small to be seen with the naked eye.

By the combined action of the many thousands of these little living threads which constitute each muscle, these organs are enabled to do the work assigned them in the body, which is that of producing motion by contraction.

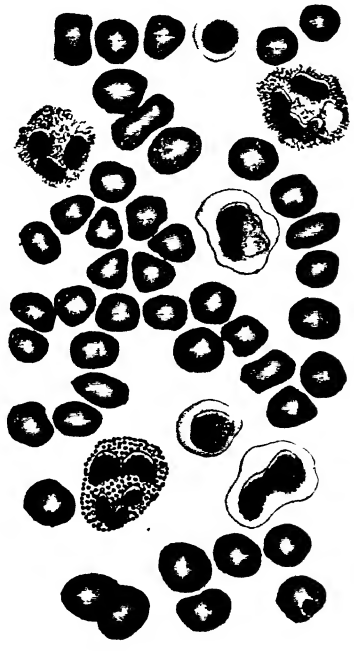
The total number of muscles in the body is about two hundred and fifty pairs, which, with very few exceptions, are arranged symmetrically, each side of the

body being provided with muscles exactly like those of the opposite side.

Muscular Movements.—By means of the leg muscles, acting upon the bones of the legs, we are enabled to walk, run, leap, etc. The muscles of the arms and hands enable us to work, write, play upon musical instruments, and engage in all sorts of manual pursuits. The muscles of the trunk sustain the body erect, and form the walls of cavities which contain the internal organs. Those of the chest are also useful in breathing, in which they act together with a remarkable muscle within the body called the *midriff*, or *diaphragm*. By delicate little muscles, the eye is moved in various directions. Still more delicate muscles adjust the ear to various sounds. It is by the action of the muscles, also, that the face is able to assume such a vast variety of expressions. Anger, scorn, jealousy, grief, and joy are all pictured upon the face by varying movements of the delicate little muscles which lie just underneath the skin.

Every movement of the body is the result of muscular action. Without muscles, a man would be as helpless as a plant or a tree, which spends its whole life just where its seed happened to take root in the soil. The heart, which by its incessant beating supplies each part of the body with life-giving blood, is simply a muscle, and even the blood-vessels, which convey the blood to the various portions of the body, are scarcely more than muscular tubes. It is by means of muscles, acting upon other organs, that we are able to speak, laugh, and sing, as well as move about.

The muscles also add to the beauty of the body,



RED AND WHITE BLOOD CELLS

THE HEART

MALARIAL PARASITES

rounding out the form, covering the ugly protuberances of the bones, and giving to the human form that grace and symmetry which places it so far above all other living forms in point of beauty. How the muscles may be developed, and how they become diseased when not properly exercised, we shall study in a future chapter.

The Heart.—Place your right hand upon the left side of the chest, just above the lower border of the ribs. You feel something which goes thump, thump, thump. Get a friend to let you place your ear upon his chest at the same spot. You hear something saying lub-tup, lub-tup. There is a live pump in there, the *heart,* which keeps working away all your life, from infancy to old age, making sixty to seventy strokes every minute, never stopping to rest even for five seconds, though sometimes it becomes tired and flags a little, and at other times gets excited and runs away at a frightful rate, sometimes so fast one can scarcely count it.

The heart, as we have already learned, is a hollow muscle. A man has more heart than a woman. His heart weighs about ten ounces, while a woman's heart weighs but eight. Roughly estimated, the heart may be said to be as large as the fist. A man with a big fist has a large heart to furnish the brawny arm with an abundance of blood. The heart of a whale is as large as a wash-tub, while that of some small creatures is microscopic in size.

A Double Pump.—The heart has a partition through the middle, the longest way, which divides it into halves, each of which is again separated into two chambers. Each side of the heart may be considered as a distinct

heart. In some lower animals, as the dugong, the two sides are connected only by a band of tissue. Some insects have three or four hearts. The cavities of the heart are connected with every part of the body by means of a set of tubes, which, at the heart, are as large as the thumb, but by subdivision become so minute in the tissues as to be invisible to the naked eye. Some of these are so small that more than a hundred would be required to equal an ordinary pin in size.

The Blood-Vessels. — There are two sets of these tubes, one, called *arteries,* communicating with the lower chambers of the heart, the other, the *veins,* communicating with the upper chambers of the heart. These two sets of tubes run side by side through the various parts of the body, finally joining at the small ends through very small tubes, the *capillaries.* Thus they become, virtually, a single set of tubes, which are large at each end and small in the middle.

The lower chambers of the heart pump the blood out into the various parts of the body through the arteries; while the upper chambers receive it back through the veins. The blood which leaves the left side of the heart, returns through the veins to the right side of the heart; while the blood which leaves the right side of the heart, after passing through the lungs, returns to the upper chamber of the left side. By means of openings guarded by valves, the blood is enabled to pass from the upper to the lower chamber on each side of the heart, but cannot pass from one side to the other, except by going the roundabout road of the arteries, capillaries, and veins.

Microscopic Wonders in the Blood

Twelve Pints of Blood.—The arteries and veins of a body of average size contain about twelve pounds, or six quarts, of blood. If you wish to know something about this wonderful fluid, you must thrust a pin into the end of your finger, squeeze out a tiny drop, spread it upon a slip of glass, and put it under a microscope. Looking at it through the instrument, you will see that it is no longer red, but of a light amber color, and on looking closely you will see that it is made up of a clear fluid in which are floating countless numbers of little round bodies, called *blood corpuscles.*

Microscopic Wonders in the Blood. — By far the larger number of the blood corpuscles are flat, or disk-shaped bodies, thinner in the middle than at the edge. They are so small that thirty-five hundred of them arranged in a row would extend only an inch. These are the red cells. There are also white cells which are somewhat larger in size. There is one white cell to six or seven hundred red cells.

The blood cells are formed by the red marrow of the bones, the spleen, the lymphatic glands, and perhaps other organs.

The blood corpuscles are not inert bodies, which float in the blood current, but are living creatures. Each one leads as independent and individual a life as the fishes that swim in the water, or the birds which fly in the air. The red corpuscles are born, grow old, and die. The life of a corpuscle is supposed to be about six weeks. Eight millions die every second of our lives, their dead bodies being destroyed and removed from the blood by organs appointed for the purpose.

The Blood Cells. — The red blood corpuscles are devoted to the business of carrying oxygen, which they find in the lungs, and transmit to every part of the body. Each corpuscle has the ability to carry a load of oxygen much larger than itself. It is only while the corpuscles are loaded with oxygen that the blood is red. It becomes a dark purple color after the oxygen has been removed. It is for this reason that the blood is red in the arteries and dark purple in the veins.

The white cells perform exceedingly important offices for the body. They capture and destroy malarial parasites and other germs which are sometimes introduced into the blood by means of mosquitoes. They repair injuries and are always present in great numbers in wounds and inflamed tissues. These marvelous little bodies,—we might almost call them creatures, as they lead an independent life,—under the guidance of a divine intelligence make their way through the walls of the vessels, and go in search of germs which have invaded the tissues. In this way it sometimes happens that large collections of white cells are found at certain infected points, as in boils. A single drop of pus may contain more than two hundred millions of these marvelous little organisms.

The plasma, or liquid portion of the blood, contains food for all the tissues, also waste matters which have been washed from the tissues and are destined to be removed from the body by the kidneys and other excretory organs. The healthy serum destroys germs and germ poisons.

How the Blood Circulates.—The business of the heart is to circulate the blood, which it does so rapidly

that a quantity of blood equal to the whole amount in the body passes through the organ every half minute. The heart of a vigorous man pumps not less than two hundred barrels of blood daily, in doing which it exercises as much energy as would be required to lift one thousand stones weighing one hundred pounds each from the ground to the shoulder.

At each heart beat, a wave of blood starts from the heart, and travels to the most remote ends of the arteries. Where the arteries come near the surface, this wave can be felt, and is called the *pulse*. The pulse rate is usually about seventy beats per minute. It is somewhat more rapid in young children, and is increased by exercise.

The blood starts out from the lower chamber of the left side of the heart, from which it is propelled through the arteries to the various parts of the body. Thence it is gathered up by the veins, and carried to the upper chamber on the right side of the heart. From this it passes to the lower chamber of the same side, whence it is forced through a large artery to the two lungs, through which it passes for purification. It is then carried by veins to the upper chamber of the left side of the heart, whence it passes to the lower chamber of the same side, from which it is again distributed to the various parts of the body.

A portion of the blood goes through two sets of veins before getting back to the heart. The blood from the stomach, spleen, and other abdominal organs is gathered up in a large vein, which distributes it through the liver by means of a second set of veins and capillaries. After passing through the liver, which pro-

duces some remarkable changes in it, it is carried by another vein to the large vein which gathers blood from the whole lower part of the body, and empties it into the right side of the heart. This is called the *portal circulation.*

The Proper Care of the Heart.—A vigorous heart is essential to a healthy and a long life. A man with a weak heart is as poorly fitted for the voyage of life as a ship would be to cross the Atlantic with a small or inefficient engine.

Every organ in the body depends upon the heart for its supply of blood, without which it cannot do its work. Without a sufficient supply of blood, the bones deteriorate, the muscles become weak, and every organ suffers.

Proper exercise strengthens the heart. If you count the pulse while lying down, you will find it to be about sixty. On sitting up, the beats increase to sixty-six or eight. On standing up, the pulse rate rises to seventy-four or five. On taking active exercise, as in running or jumping, the pulse may be quickened to one hundred beats per minute or even more. The heart is a muscle, and proper exercise, by thus increasing its activity, may increase its vigor. Exercise, by increasing the activity of the heart, also secures a more rapid distribution of the blood, and thus quickens all the vital processes of the body.

Too violent exercise may injure the heart by overtaxing it, and may even cause rupture of one of the delicate ligaments by which its valves are controlled.

The effects of tobacco, alcohol, and all kinds of stimulants are particularly serious upon the heart, weakening it, at first temporarily and afterward perma-

nently, by causing degeneration of its tissue into fat. A great share of the deaths from so-called heart disease may fairly be charged to alcohol and tobacco.

Impure Blood.—The blood may be poor in quality from containing impurities gathered from the tissues and not removed with sufficient rapidity, or injurious substances which have been taken in along with the food, or from indulgence in stimulants or narcotics. It may be impoverished by having an insufficient supply of the elements required to nourish the tissues. To keep the blood pure and of good quality, one must be careful to keep in good active operation the skin, lungs, liver, kidneys, and bowels,—channels through which its impurities are removed,—and must carefully avoid taking into the system substances which cannot be used, and which must be removed. Of this class, alcohol, tobacco, and the various stimulating condiments, such as mustard, pepper, pepper-sauce, etc., are among those most commonly used.

An examination of the blood after a sleepless night, or when an insufficiency of food has been taken, shows a very great decrease in the red blood corpuscles, which sufficiently emphasizes the necessity for an abundance of sleep and nutritious food. An eminent New York physician claims to be able to tell by examination of the blood whether a person has slept well the previous night, or whether he has been indulging in excesses of any sort.

If the blood is kept pure and well supplied with the elements necessary to build up the body, the organs of the body will be maintained in health. The blood creates. The blood heals. "The life is in the blood."

But our lungs require that the air which they contain should be changed eighteen or twenty times a minute when we are quiet, and twice as fast when we run or engage in any violent exercise.

The Lungs.—The lungs remove certain impurities from the blood. To facilitate this work, they are lined with a delicate membrane which, if spread out, would cover a surface of more than two thousand square feet, or about eighty square rods. Underneath this membrane, an amount of blood equal to the entire quantity contained in the body, passes every minute for purification, giving off certain poisonous elements, and taking up the life-giving oxygen, which it carries to all the tissues, thus giving them life and activity. We shall learn more about the work of the lungs in a future chapter.

The Alimentary Canal. —A tiny creature that lives in the warm waters of the tropics has within its body a little sac which serves the triple purpose of heart, lungs, and stomach. In many of the lower orders of animal life, the heart and stomach are united; but in man the three processes of blood circulation, air-breathing, and food-digestion, are carried on by three distinct organs. As commonly used, the term *stomach* includes all the organs employed in digesting food, of which the stomach proper is only one, and by no means the most important.

The digestive apparatus consists of a very crooked tube some thirty feet in length, which extends from the lips to the other extremity of the trunk. Along this tube are ranged various organs which have more or less to do with the process of digestion.

The Mouth Mill.—At the upper end of this tube are placed the *teeth*, which, with the jaws, constitute a mill, where the food is ground so as to enable the succeeding organs to act upon it with ease. Some animals, which are not supplied with teeth in their mouths, have very excellent teeth in their stomachs, by which the food is masticated in a most thorough manner. When disposed to eat too fast, we should remember that our stomachs have no teeth; and, hence, if the food is ever chewed at all, it must be done before it is swallowed.

The *tongue* aids in the grinding process, by keeping the food between the teeth, and moving it from one side to the other.

Three pairs of glands, arranged on either side of the mouth, pour into it a clear liquid, the *saliva*, which is mixed with the food to soften and otherwise change it. A narrow tube leads from the back of the mouth to the stomach proper, situated just below the lower end of the breastbone.

The *stomach* is simply a dilated portion of the digestive tube, or, as it is sometimes called, the *alimentary canal*. It holds about three pints. In its walls are curious little pockets, in which is formed the *gastric juice*. The lower end of the stomach joins the *small intestines*, which are folded up in the abdominal cavity, and measure about twenty-five feet.

A few inches below the stomach, a small opening is found in the small intestines, through which enter two very important liquids, the *pancreatic juice* and the *bile*. The first is formed by the *pancreas*, a hammer-shaped gland which lies just back of the stomach; the

latter, by the *liver,* which lies at the right side of the stomach, partially overlapping it.

All along the small intestine are scattered minute glands buried in the mucous membrane, which make another fluid, called the *intestinal juice.* At the lower right-hand corner of the abdominal cavity, the small intestine widens out into the *colon,* or *large intestine,* which is about five feet in length, and completes the digestive apparatus.

Five Digestive Fluids.—As we have already noted, there are several fluids concerned in the process of digestion,—the *saliva,* the *gastric juice,* the *bile,* the *pancreatic juice,* and the *intestinal juice.* These are all used to dissolve the food so it can be absorbed by, or taken into, the blood. Each fluid has its particular work to do in transforming some portion of the food into a substance different from what it was, and preparing it to be received into the blood and converted into tissue. Thus, the saliva acts upon the starch of the food, changing it to sugar. The bile digests fat, and aids in the absorption of other portions of the food after it is digested. The pancreatic juice digests starch, albumen, and fats, the three most important elements of food. The intestinal juice digests each of the kinds of food elements mentioned above, and also cane sugar. It is important to notice that cane sugar is digested only by the intestinal juice, which acts, not throughout the whole alimentary canal, but only in the intestinal portion of it.

The Digestion of a Morsel of Food.— If we could see a morsel of bread undergoing digestion, we should notice, first, that while it is being chewed, the saliva

converts a small portion of the starch into sugar. After it is swallowed, the gastric juice begins its work, and digests the albuminous portion of the bread, known as gluten. Just after it passes out of the stomach into the intestine, the liver and gall bladder contract, and pour out a quantity of bile, which searches out any little portion of oil the bread may contain, or the butter which may have been eaten with it, and converts this fatty matter into a creamy substance, which is readily absorbed and distributed throughout the body. The pancreatic juice next finds the digesting morsel, and completes the work begun by the saliva, the gastric juice, and the bile, doing the work of these three fluids much more thoroughly and efficiently than they are capable of doing it themselves. The intestinal juice acts upon any little portion of cane sugar which may have been taken with the food, and gives the finishing touches to the work which has been begun by the preceding digestive fluids.

Thus the mouthful of bread is completely digested. It is next absorbed by millions of hungry little mouths, which are ready to suck up the digested food into the blood-vessels, by which it is carried, first to the liver, and thence to the heart, from which it is distributed to the various parts of the body.

The Liver.— If we should put a very small bit of liver tissue under a powerful microscope, we would find it made up of thousands of little round cells, each of which is a busy little worker, devoted to the trade of bile-making. The whole structure of the liver is made up of these cells, together with the vessels which convey blood through it, and the delicate system of sewers

which collect the bile, where it is formed by the bile-making cells, and convey it into a large sac placed on its under surface, and called the *gall bladder.* A tube leads from the liver and gall bladder to the small intestine, into which it opens a few inches below the stomach. The weight of the entire organ is about three and one-half pounds, being the largest of all the glands in the body.

The Work of the Bile.—The bile is one of the most useful, and certainly the most remarkable, of all the fluids of the body. It is a golden yellow color in human beings and dogs. The bile, or gall, of an ox is green; and in certain diseases persons vomit bile of a green color, which has led to the supposition that human bile is green also. This is not correct, the green color of vomited bile being due to changes which take place in the stomach, where it comes in contact with the gastric juice. The bile has more uses than any other fluid in the body.

1. As we have learned, it aids digestion, helping to change the fats of our food into a creamy substance, called an *emulsion,* which can be easily absorbed.

2. The bile aids in all of the digestive processes which take place in the small intestine, by destroying the activity of the gastric juice, which is strongly acid, and, except for the neutralizing influence of the bile upon it, would prevent the action of the pancreatic and intestinal fluids. Bile also excites the intestines to contraction, by which the digesting food is moved along, and in some mysterious manner helps the mucous membrane to absorb the food after it has been digested.

3. It consists largely of waste substances which have been gathered from various parts of the body. When the liver does not do its work properly, these foul matters accumulate, and a person feels "bilious."

Wonderful Functions. — But the liver does more than make bile. As before stated, most of the blood which passes through the abdominal organs—the stomach, intestines, pancreas, and spleen—is gathered into one large vein, which carries it to the liver, through which it is distributed. The object of this arrangement is to enable the liver to complete the process of digesting such elements of food as have been absorbed before the work was finished, and especially to remove from the blood deleterious substances which have been absorbed with the food.

One of the most important offices of the liver is to gather out of the blood and store up in itself, in the form of a kind of animal starch, the large amount of sugar which is sometimes eaten with our food, and is always formed in the process of digestion when starchy foods are eaten. If these were allowed to enter the general circulation at once, great mischief would be done to many organs of the body; and it is to prevent this that the liver separates the greater portion of it, and doles it out to the blood in small doses, in the intervals between our meals. It is readily apparent that if a person habitually eats more sugar than it is possible for the liver thus to take care of, great harm may be done to the liver, as it would be overtaxed in trying to do its duty to the entire body.

Recent experiments by Prof. Alfred C. Croftan, of Chicago, have shown that the liver is active in destroy-

ing uric acid, converting into urea nearly one-fifth of the uric acid produced in the body each twenty-four hours. When the liver is overwhelmed with work through the use of excessive quantities of sugar, large amounts of fat, or the addition to the food of mustard, pepper, pepper-sauce, and other irritating condiments, by the use of alcohol, tea, coffee, or tobacco, or even by taking an excess of wholesome food, it loses its ability to destroy uric acid in proper amounts. This poison then accumulates in the body, and rheumatism, neuralgia, nervousness, varicose veins, apoplexy, paralysis, Bright's disease, and various other maladies result.

Meat eating is one of the most certain methods of overtaxing the liver, for meats of all sorts contain uric acid. Professor Hall, of Manchester, England, has shown that beefsteak contains as much as fourteen grains of uric acid to the pound. Fish, flesh, and fowl of all kinds contain large amounts. Liver contains nineteen grains to the pound, and "sweet bread" seventy grains to the pound. The total amount of uric acid produced each twenty-four hours is about fifty grains, of which the liver is able to destroy only about one-fifth, or ten grains. By eating beefsteak, liver, and other flesh foods one may easily double the amount of uric acid with which the liver and other organs have to deal. The overtaxed organs may do their work faithfully and well for years, but sooner or later the time comes when the overworked organ must fail. Then disease manifests itself in hardening, or cirrhosis, of the liver, Bright's disease, premature

old age, hardening of the arteries, and in various other morbid manifestations.

A Wonderful Sentinel. — The liver is a self-sacrificing organ, not hesitating to remove from the blood poisonous substances, even retaining them in itself, instead of allowing them to circulate in the rest of the body. Hence it is that when a person dies in a drunken fit, the liver is found to contain more alcohol than any other part of the body. The same is true of mercury, arsenic, and other metallic poisons, in cases in which death has resulted from their use. Hence, also, follows the great mischief to the liver from the use of mustard, pepper, pepper-sauce, and all hot and irritating condiments. Notwithstanding the generous behavior of the liver, it is blamed for a vast number of human ailments for which it is not responsible. Take good care of your liver, and it will never tire of taking excellent care of you.

An eminent French physician has shown that the so-called gin liver is often found in persons who have not used alcohol. His experiments demonstrated that pepper has six times the power to produce gin liver that gin has, and the acid of vinegar twice the power. Chronic dyspepsia breaks down the liver by flooding it with the poisons produced by fermentation and decomposition in the stomach and bowels.

Twenty Square Feet of Skin.—The anatomists tell us that if the entire skin of the body be removed and spread out, it will cover an area of fully twenty square feet.

Viewed by the unaided eye, this covering of the body is not particularly interesting. Viewed with the micro-

scope, the skin is found to be a very complicated and wonderful structure. Its outer portion is composed of several layers of little flat scales, which overlap one another, and form a sort of horny protection for the more delicate parts beneath. Its lower portion contains the elements which constitute the true skin, and these consist, first, of a network of elastic fibers, which give to the skin its great distensibility. As the body develops, the skin is stretched to accommodate itself to the growing form. The outer skin contains—besides this elastic network, and dispersed among its meshes—various nerves, which give to it sensibility to touch, and the power of discerning differences in temperature, and, most important of all, great numbers of little tubes, each a small fraction of an inch in length. The lower portion of each of these tubes is coiled up deep down in the skin, while the upper part passes obliquely to the surface. These are sweat glands, of which there are several millions in the body.

The objects of the skin are—

1. *Protection.* It is a good non-conductor of heat, and so protects the sensitive tissues beneath from ordinary changes of temperature, and by its toughness protects them from harm which would otherwise result from contact with objects.

2. *Respiration.* The skin, like the lungs, is a breathing organ. A frog can breathe with its skin so actively that one has been known to live for some days after its lungs had been removed. The human skin is less active as a breathing organ than that of the frog; but its action in this respect is quite too important to be safely ignored. It is through the interference with this breath-

ing process that neglect of cleanliness of the skin results in harmful effects. To allow the skin to become covered with impurities is just as much a choking process as constriction of the neck or compression of the waist.

3. *Excretion.* The skin is an organ of excretion, carrying away out of the body, through the sweat, a large amount of impurities. This is evidenced by the fact that persons who eat large quantities of salt observe that the perspiration has a very saline taste.

4. *Temperature.* The skin performs a very important office in regulating the bodily temperature. The temperature of the interior of the body is always about one hundred degrees, although the temperature surrounding us may vary from several degrees below to three hundred degrees above. It is through the action of the sweat glands and the evaporation of moisture from the skin that the body is enabled to endure the high degrees of temperature to which it may be subjected, for short periods at least, without injury.

5. *Sensibility.* The skin is an organ of sense, giving us information concerning the form and consistence of objects, their temperature, and also the degree of pressure which they exert. Sensibility to pain also serves as a warning to protect other organs of the body from injury.

The Kidneys.—Imbedded in the tissues of the body, at the back of the abdominal cavity and a little below the stomach, are placed two of the most important organs of the body, the *kidneys.* These important organs, though very unlike the skin in appearance, are in some respects closely related to it.

The kidney is chiefly made up of little round cells, from each of which runs a delicate tube. The tubes run from the outside of the organ inward, joining together to form larger tubes as they approach the center, where they communicate with quite a large cavity, from which a large tube, called the *ureter,* leads to the bladder. The business of the cells and tubes is to separate from the blood a fluid containing the various poisonous substances which constitute the urine.

The *bladder* is a reservoir for the urine, which at proper intervals is discharged through the *urethra.*

Work of the Kidneys.—The kidneys are chiefly serviceable to the body by the removal of the poisonous substance known as *urea,* of which they separate from the blood nearly one ounce every twenty-four hours; and by the regulation of the degree of fluidity of the blood. If we drink a large amount of water, the amount of urine is increased, as the water dilutes the blood beyond its normal condition, and the amount of urine is very largely increased, sometimes within a few minutes after the water has been taken.

The amount of urea contained in the urine depends largely upon the individual's diet, and his habits as regards exercise, etc. The urine of a person who eats largely of meat has an excessive quantity of urea, which is due to the fact that a considerable portion of the meat eaten is never used as food, not being assimilated by the tissues, but is at once converted into this poisonous substance, so that it may be removed from the body as quickly as possible.

A white, pink, or brick-dust sediment appearing in the urine is usually evidence of the presence of an ex-

cessive quantity of uric acid, or allied substances, and suggests either that the individual is taking food containing uric acid, so that his system is overwhelmed with this substance, or that his kidneys or other organs are failing to do their work in destroying uric acid. The kidneys and liver destroy about one-fifth part of the uric acid produced in the body. This amounts to about ten grains each twenty-four hours. A pound and a half of beefsteak contains considerably more than this, or about twenty-one grains, according to the investigations of Professor Hall, of Manchester, England, and Dr. Haig, of London. When the kidneys are compelled to deal with an excessive quantity of uric acid, they do not have time to do their work properly. This poison accumulates in the body, and the result is gout, rheumatism, and various other uric acid disorders. The kidneys themselves suffer in time irreparable damage and come to be the seat of chronic Bright's disease in some one of its numerous forms. Sooner or later dropsy appears, and the patient dies sometimes without ever having suffered pain or inconvenience other than shortness of the breath, swelling of the limbs, and other symptoms which accompany chronic disease of the kidneys. The adoption of a diet of fruits, grains, and nuts, the disuse of salt, and the drinking of hot water an hour before each meal and half an hour before retiring at night, will usually cause this symptom to disappear.

When the urine is very foul smelling or irritating, a physician should be consulted concerning the matter, at least if the difficulty is not made to disappear quite

promptly by adopting the use of hot water, as suggested in the preceding paragraph.

Three Pounds of Brains.—The brain of an average man weighs about three pounds. A woman's brain, like her body, weighs a little less. If we examine a little speck of brain substance under the microscope, we find it to be largely composed of curious living cells, some of which look very much like a tadpole with a long tail; others like a spider with legs projecting on all sides. Each of these little cells, half a thousand of which would be required to make a row an inch long, is a living creature, and has its particular work to do. If we examine with sufficient care, we shall find that the tails, or fingers, possessed by the little creature while in its natural position in the brain, before it has been torn from its surroundings, are immensely long, running to all parts of the body. Some of these fingers are so small that a hundred million of them would be required to make a bundle as thick as your thumb. Thousands of these fibers gathered together form the nerves and the greater portion of the spinal cord, by means of which the brain is connected with all parts of the body.

When we thrust a pin into the end of the finger, it gives us pain, because there are some little cells in the brain which send out long, hair-like fibers which end in the skin covering the part where the pin is applied. The cells in the brain recognize the pain, and refer it to the finger. These curious little organisms are called *nerve cells.*

Millions of Nerve Cells.— Eminent authorities estimate that there are probably more than twelve hun-

dred million of these cells in the brain and spinal cord. These wonderful cells control the whole body. All the other organs of the body may be considered as simply servants to the brain. The little cells send out their long fingers to the muscles, glands, lungs, heart, stomach, liver, and all the other organs, and through them send impulses to these various organs, by which they are made to act. Thus, when we wish to move the hand, the cells in the brain which communicate with the muscles of the arm, send down an order to the muscles to contract, and do our bidding. The heart beats, the lungs breathe, the liver makes bile,—all in obedience to the commands received from the nerve cells which preside over it. The nerve cells are divided into classes, each of which has its particular work to do.

Wonderful Thinking.—The chief business of nerve cells is to think and feel. The nerve cells found in the spinal cord are chiefly of two classes. One class receives impressions brought through their fingers from the outside of the body. These impressions they communicate to another class of cells, which, through their fingers, send out impulses to the parts from which the impressions came, or to other parts, causing them to act. For example, when the bottom of the foot is tickled, the limb draws up in spite of us. It does the same thing if we are asleep, or if the limb is paralyzed so that we cannot control it by the will. This is a very simple kind of thinking, which is done by the nerve cells of the spinal cord. There is a special collection of nerve cells in the enlarged upper end of the spinal cord, called the *medulla,* which does a little higher grade of thinking. These cells regulate the activity

of the heart, bowels, liver, and other internal organs. At the base of the brain a large collection of nerve matter constitutes what is called the *little brain,* which has for its important function the duty of regulating the action of those nerve cells that control the muscles, so that the muscular movements may be orderly and able to accomplish what is desired of them.

Arranged at the under part of the brain are found nerve centers having charge of the organs by which we are able to see, hear, smell, taste, etc. When we see objects, it is because impressions are received by the eye, and are carried by nerves to the cells at the base of the brain which have charge of the sense of sight, and which are thereby made to act. Whatever causes these cells to act, will give us the impression of light, as illustrated by the effect of a blow upon the head, or a fall upon the ice, which causes us to see stars, by communicating a shock to the nerve cells that have charge of the sight.

Overtopping all the rest of the nervous system is to be found the *great brain,* which does the highest kind of thinking of which we are capable. It is with this part of the brain that we are enabled to reason. Here is also located the memory and all the various mental and moral faculties. This portion of the nervous system rules all the rest. It is the organ of mind and of will.

Brain and Mind.—The next question, "What is the mind?" we do not need to discuss, more than to observe that it is the result of the action of the brain, the highest kind of thinking done by nerve cells. How brain action results in thought, we cannot understand;

but it is also quite as difficult for us to understand how brain action results in muscular action, or in the manifestation of force of any sort. That the brain is the organ of mind, and that mind is associated with its activity, is evidenced by a number of facts:

1. When the brain is injured by disease or by accident, the mind is impaired or destroyed, though the rest of the body may remain in comparative health. When the brain ceases to act, as in sound sleep, consciousness and mind action also cease.

2. The amount of intelligence which an animal is able to exhibit depends upon the size of the thinking portion of the brain in proportion to its body. Man is the most intelligent of all animals simply because he has more cells capable of thinking than any other animal. There are animals which possess a larger brain than man, but none in which the thinking portion of the brain is so great, in proportion to the size of the body. It is also observed that men whose brains are largest in proportion to their body, other things being equal, possess the greatest intelligence. For example, a man who has a four-pound brain is more likely to be a philosopher, or to be distinguished for great mental powers, than a man whose brain has only the average weight of three pounds; while a man whose brain weighs but two pounds is certain to be an idiot.

Women have smaller brains than men, the average weight of a female brain being about six ounces less than that of the average man. Women have also smaller bodies. The mind of man, with its marvelous powers of invention, imagination, reasoning, judgment, and volition, is in itself one of the most conclusive evi-

dences of a divine mind, a great creative intelligence from whom comes all life, all power, all intelligence. There is a universal intelligence. Thought is not made by the brain, it is received, recognized, applied by it.

The Eyes. — Nearly all animals possess certain nerves which are sensitive to light. Even the jellyfish, which has hardly any nerves at all, and certainly has no eyes, seems happiest in the sunlight, and is disturbed whenever a cloud passes over the sun.

Did you ever see a leech,— one of those curious creatures which the doctor sometimes applies to draw away a little blood from an inflamed part? If you should examine one of these strange animals, you would find, close to the little opening which constitutes its mouth, a circular row of minute red spots. These are its eyes. By examining one of these red spots with a microscope, it is found to consist of a little dark pigment, or coloring matter, over which is spread a thin, transparent skin. Between the colored and the transparent layers is placed a very delicate membrane, which contains the nerves of sight. These nerves pass from the eye-spots back into the creature's little brain, where they unite with certain cells which have charge of the sense of sight.

The leech has the simplest kind of seeing apparatus. The human eye has essentially the same kind of structure. The eyeball, as the round globe of the eye is called, has a dark-colored lining at its back part and a transparent membrane in front.

Just inside of the delicate lining is stretched out the membrane which contains the nerves of sight. The space between this and the transparent membrane in

front is filled up with transparent substances through which the light readily passes. In front, and just behind the transparent portion, is placed a little curtain with a hole in the center, which contracts and enlarges according to the intensity of the light, so as to protect the delicate nerves of sight from injury upon exposure to too bright light.

We have not here the space to study the delicate arrangements by which the eye is made to see objects at a near or a remote distance.

It is of the highest importance that care should be taken to preserve the eyes. There are a few rules relating to the care of the eyes, the observance of which is of the greatest importance. One of the most important of all is that when used for fine work by the aid of artificial light, the source of light should be so placed that the light will fall upon the page from behind and over the left shoulder. The reason for this requirement is that when the light is in front, it shines directly into the eye and causes contraction of the pupil, whereby clearness of vision is interfered with, and the constant strain to which the eye is subjected to make vision clear produces congestion, and after a time leads to inflammation, and may even cause destruction of sight. It is better that the light should shine over the left shoulder for the reason that the right hand is chiefly employed in such fine work as writing, engraving, etc., and if the light falls upon the page from the right side the field of work is likely to be obscured by the shadow of the hand or of the pen. This is not true when the light shines from the left.

It is well to avoid using the eyes in reading when riding on the cars, in a wagon, stage-coach, in a street car, or under any other circumstances when it is impossible to hold the book or paper steadily. When vision is blurred or the use of the eyes painful, or when headache is produced by use of the eyes, a skilled oculist should be consulted at once, so that the eyes may be examined carefully and instruction given for their future care. In many cases glasses are required. Young children often require glasses to correct natural defects, which cannot be cured, such as near-sightedness, hypermetropia, astigmatism, etc.

Ears. — The curious barnacle, which passes its life clinging to the slimy bottom of some old ship, has the simplest kind of ear imaginable. The organ in this animal is a little sac filled with fluid, which hangs in a chamber communicating with the surface, and filled with sea water. In the walls of this sac, the nerves of hearing, for which, in its vegetable-like life, it can have very little use, are distributed.

The ear of a fish consists of a small sac, containing two or three chalky masses called ear bones, placed in a chamber adjacent to a sac containing the ear fluid and nerves of hearing. The fish's ear is entirely inclosed in a hollow in the skull. It hears by means of the vibration of the water, which is communicated to the bones of its head, thence to the ear bones, and then from these to the delicate sac from which the nerves of hearing convey the impression to the brain.

The human ear, consisting of the same essential features as that of a fish or a barnacle, is much more complicated in its structure. There is within a hidden

recess in the skull a curiously shaped sac filled with fluid, and containing a number of minute ear stones. This sac is connected by means of a chain of bones with a vibrating membrane, which closes the end of the canal connected with the external organ ordinarily known as the *ear*. Sounds are produced by vibrations in the ear. These vibrations are gathered by the external ear, and cause vibration of the membrane, which, from its striking resemblance to that of a drum, is called the *drum membrane*. This vibration is carried by the chain of bones across the cavity in which they are placed, termed the *drum cavity,* to the delicate sac, within which are found the *ear stones* and the nerves of hearing. The little ear stones dance up and down upon the ends of the nerves, and produce sensations which are carried from the ear to the brain. The vibrations produced are known as *sound*. Rules for preserving the health of the ear are given elsewhere in this work.

Noses.—The nose, one of the most conspicuous features of the face, though one of the most neglected organs of the body, is useful as well as ornamental, and worthy of at least a moment's notice. The primary office of the nose is to receive air to supply the lungs. For this purpose it has two openings in the face, which communicate with the large nasal cavity, partially divided into two compartments by the septum of the nose, and which communicate at its back part through a single opening to the mouth, and thence with the air passages leading to the lungs.

On either side of the nasal cavity, three scroll-shaped projections, ranged one above the other, are

to be found. The mucous membrane covering the uppermost of these projections, together with that which lines the other portions of the roof of the nasal cavity, contains the nerves of smell, by means of which we are able to distinguish odors. In civilized human beings, this sense is by no means as acute as in the lower animals and in members of savage tribes. This is undoubtedly due to the neglect to cultivate this important sense. It may also be attributed, in part at least, to the very general prevalence of nasal catarrh, which often results in partial or complete destruction of the sense of smell. This disease, its causes and proper treatment, will be referred to in another chapter.

How and What We Taste.—The nerves of taste are located in the tongue and the back part of the mouth. Substances must be dissolved, to be tasted. The tongue, like the skin, is also an organ of touch. Indeed, it is much more sensitive to the touch than the skin. Substances which have an acrid, saline, or astringent flavor, like mustard, pepper, salt, etc., properly speaking, we do not taste at all, but feel. The sensations which they produce upon the tongue differ in degree, but not in kind, from that which they produce when applied to the skin. Many other substances which have a pronounced odor are smelled rather than tasted, the odorous property to which we attribute flavor being carried to the nose through its posterior opening by the breath, while the substance is being chewed. The only true tastes are sweet and bitter. Most flavors are combinations of taste proper with feeling or smell.

The object of the sense of taste is to tell us whether substances taken into the mouth are wholesome or

poisonous. It is a universal rule that substances with an acrid, astringent, or other unpleasant flavor are unfit for food, and liable to do harm if taken in any quantity. Mustard, pepper, pepper-sauce, ginger, and other similar substances commonly used as condiments, are all poisons.

They are all injurious to the digestive organs, as we shall see elsewhere; and, hence, the warning against them which nature gives us in their peculiar flavors, should be recognized and obeyed.

Professor Pawlow, the eminent physiologist of St. Petersburg, recently pointed out the interesting fact that the sense of taste exercises a most important influence on digestion. Flavors present in food by exciting the nerves of taste cause the gastric glands to produce a highly active gastric juice, which Professor Pawlow calls "psychic juice." This "psychic juice" is found to be more active in the digestion of food than that which is formed by the contact of the food with the lining membrane of the stomach. From this fact two important lessons are drawn: first, the food should be well flavored so as to influence the sense of taste in a decided manner; second, the food should be retained in the mouth by prolonged mastication until its flavor has been appreciated to the fullest extent. When food is taken in this way, each morsel of food will generate the digestive fluid necessary for its digestion.

THE MYSTERY OF A NEW LIFE

NO subject in the entire range of physiology possesses such a power of fascination over most minds, as this. The physiologist studies the process in plants and animals of all classes, and sees in it the manifestation of a creative power which is manifestly identical with that by which the first man and all other living things were brought into existence. The uneducated witness the phenomenon of reproduction with less appreciation of its sublime affinities, but with endless wonderment, and an insatiable curiosity to penetrate the cloud in which the "mystery of a new life" is enveloped.

Notwithstanding, the subject of reproduction has in some way become connected, in the minds of the majority of persons, with ideas of vulgarity and grossness. So deeply rooted is this prejudice, it is almost impossible to speak or write upon this subject, no matter how judiciously, without arousing a bitter and almost fanatical opposition, even from some of those who love purity and abhor vice, although in their blindness they place themselves in opposition to an effort to rob sensuality of its greatest ally, the cloak of mystery which custom has thrown about the subject of reproduction.

The object of this chapter is to treat this subject, the anatomy and physiology of reproduction, from a purely scientific standpoint, divested of all mystery, and of that sentimental gloss with which the prurient literature of fiction has covered it.

Anatomy of the Male Sexual Organs.—The essential organs of reproduction in male animals are the *testes,* or *testicles,* which produce a viscid fluid known as *sperm,* and this, when mixed with other secretions, constitutes the *seminal fluid.* The testicles are, in man and most of the higher animals, suspended outside of the trunk in a membranous pouch, the *scrotum.* In the whale, the elephant, and the seal, the testes are retained within the trunk, where they are also found in man at an early period of fetal life. Occasionally, the organs fail to make their descent, or return to the abdominal cavity after having descended.

The testes are separated by a partition in the scrotum. Each weighs from three-fourths of an ounce to an ounce, the left often being a little larger than the right. Each testicle is divided into several hundred lobules, in each of which is found coiled up a minute tube. These, joining together, form larger tubes, which, finally uniting, form a large duct, called the *vas deferens.* This tube, together with the arteries and veins of the part, forms the *spermatic cord,* by which the testicle is suspended.

The vas deferens passes upward from the testicle, enters the abdominal cavity through an opening near the groin, and ends at the base of the bladder. Here it meets another duct, coming from a sac, the *vesiculae seminales,* placed at the base of the bladder, in which

is formed a peculiar mucous secretion. The two ducts unite to form a duct called the *common seminal,* or *ejaculatory duct.* The last-named duct passes through a mass of glandular and muscular tissue, called the *prostate gland,* and joins the *urethra,* the urinary passage from the bladder outward.

That portion of the urethra which passes through the prostate gland is known as the *prostatic* portion. Just in front of the prostate is a somewhat contracted portion about one inch in length, known as the *membranous* portion. Just here are found a pair of small bodies known as *Cowper's glands,* which, with the prostate, furnish the greater part of the secretion known as the seminal fluid.

The urethra passes outward through the male organ of *copulation,* the *penis,* which is composed of a peculiar kind of structure known as erectile tissue. The end of the organ, termed the *glans,* is covered by a fold of the skin, called the *prepuce,* or foreskin. This is sometimes too long, and is often so contracted at the end that it cannot be readily drawn back over the glans, which is essential for daily cleansing, owing to the rapid accumulation of a secretion peculiar to this locality. In such cases a surgical operation is needed, and should be done in early childhood, so as to prevent local irritation, which often leads to evil habits.

The Physiology of Reproduction.—If we gather a little of the green scum which may be found upon any stagnant pool, and place a small speck of it under a microscope, we shall find among the many curious forms of plants and animals presented to the eye, a peculiar class of organisms which are arranged in rows

and attached together, so as to form filaments. These are very simple forms, each individual being scarcely more than a simple rounded cell. If we study these curious forms of life for some time, we will occasionally find two of the rows arranged side by side, and may notice that two of the cells—one in each of the rows—lying adjacent to each other have apparently grown together, as seen in the illustration. By watching very closely indeed, we may observe that the contents of one of the cells seems to be moving toward the other cell.

This is the simplest form of generation. The cells composing one of the filaments are of one kind, which may be termed male; and those of the other are of another kind, which may be termed female. Although the eye, even when aided by the microscope, discovers no apparent difference between them, they are known to be different because they act differently. When the two kinds of cells unite, one cell is gradually merged into the other. The cell which is thus lost is the male cell. The process of combining is known as *fecundation, impregnation,* or *fertilization.*

The cell formed by the combination of the male and female cells becomes what botanists call a "resting spore," which after a time undergoes many curious changes, by which new individuals of the same species are produced.

Sex in Flowers.—In higher orders of plants, a very similar process occurs. One flower, or one part of a flower, produces the male element, and another part of the flower produces the female element. The male element is known as *pollen,* formed on the stamens, or

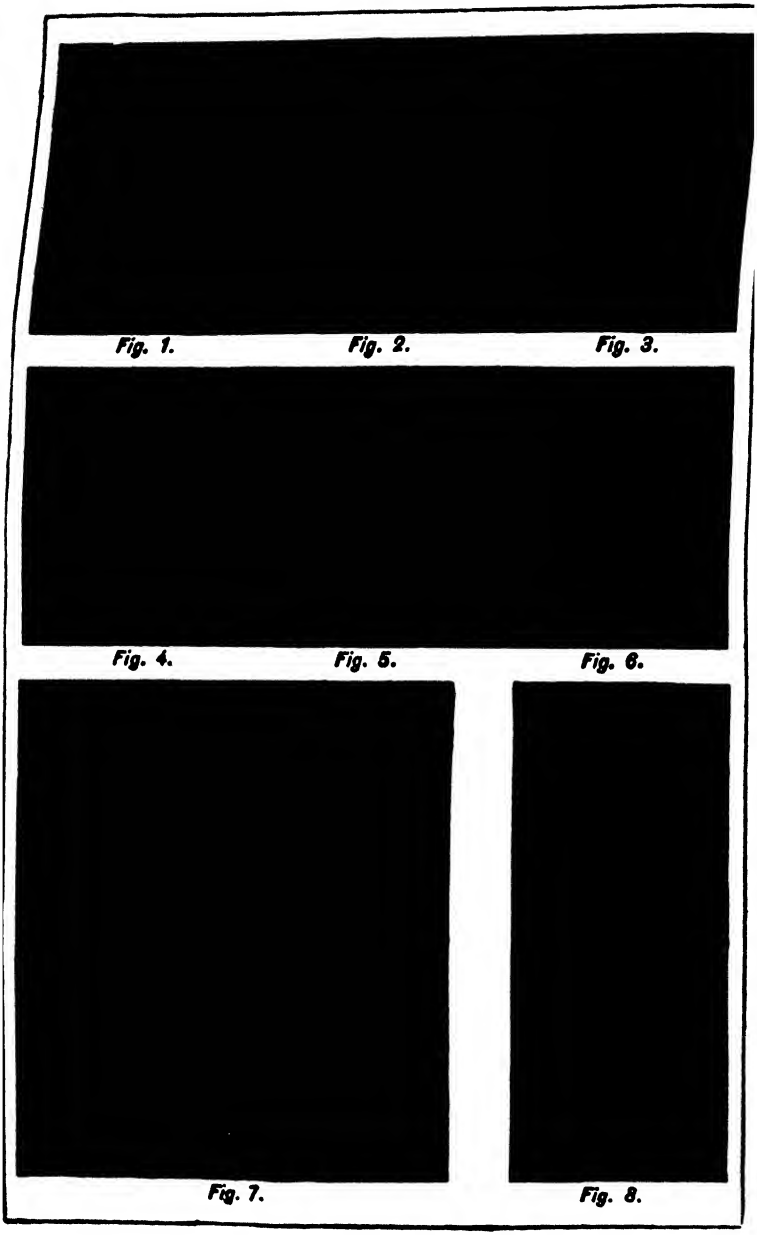


Fig. 1. *Fig. 2.* *Fig. 3.*

Fig. 4. *Fig. 5.* *Fig. 6.*

Fig. 7. *Fig. 8.*

by male and female organisms, each of which is furnished with a special organ or set of organs, for the purpose of producing its characteristic reproductive element. The reproductive element in animals is known as a spermatozoön. The female element is called the ovum. For illustration of some of the different forms of these elements found in different species of animals, see accompanying illustration.

Testes and Ovaries.—The male element, as already explained, is produced by organs known as *testes;* the female element, by organs called *ovaries.* The production of the generative elements is, in some classes of animals, constant, and in others intermittent or periodical. In most species of animals the male element is produced constantly, while the female element is produced, or at least matured, only at regular intervals. In the human female, as in the female of all the higher orders of animals, the ova are matured periodically, usually in human species, once in about four weeks, the cycle being usually marked by the *menses,* or *menstruation.* The ovum is matured at the time of menstruation, but it is not usually discharged until a few days subsequently. In lower animals, the periodical process known as "the rut," corresponds to menstruation in the human species, although it is not accompanied by a sanguineous discharge. The latter has been noticed, however, in some species of the ape tribe, which approach most nearly to man in their physical structure.

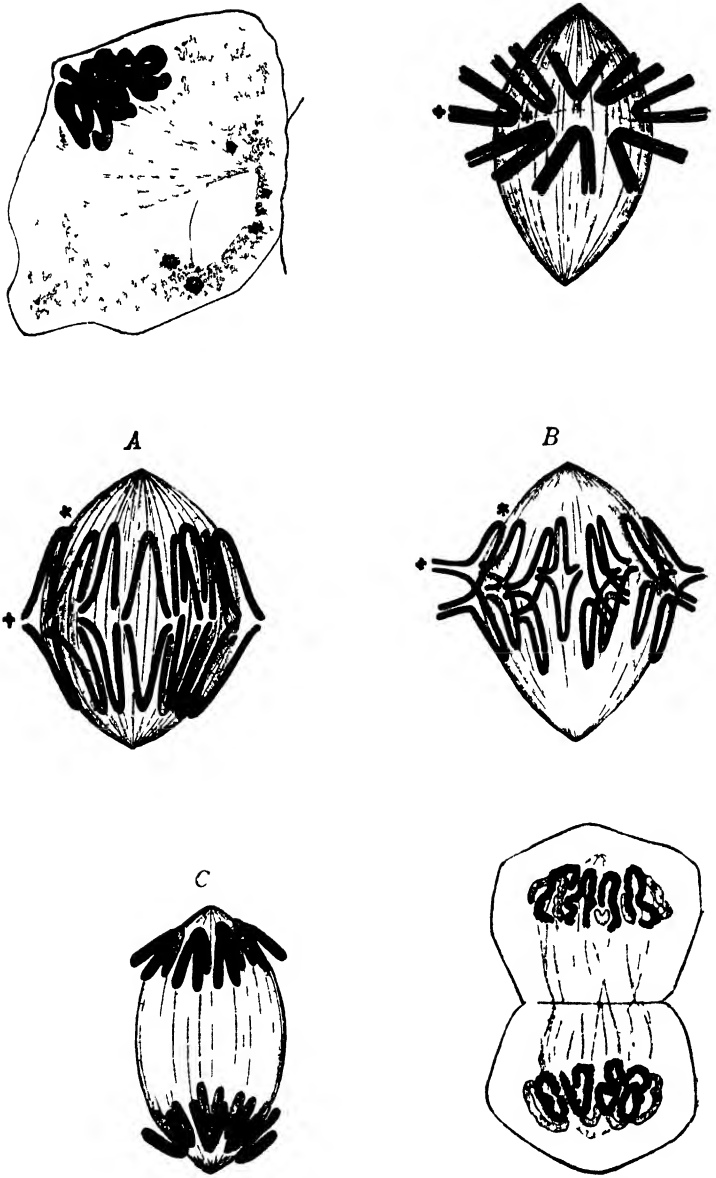
Fecundation.—The act of impregnation, by which the male and female elements are brought in contact in the higher forms of animal and vegetable life, is

accompanied by a greater or less degree of excitement on the part of the individual organisms. Even in plants, during the development and fertilization of their flowers, which are the sexual organs of plants, there is a noticeable increase of activity, a rise of temperature, and an exuberance of perfume, which indicate a high degree of excitement of a peculiar kind. In the higher animals, the act is accompanied by the highest degree of nervous excitement of which the body is capable, the exhausting character of which is readily seen by the fact that in some instances the act is almost immediately followed by the death of one of the participants,—the male—as in the case of the honey-bee.

Gardeners are also well aware of the fact that plants become sickly, and go into a sort of decline, if compelled to produce flowers too profusely, or for too great a length of time.

Conception.—In impregnation, the ovum is penetrated by the spermatozoa which come in contact with it, and ultimately disappear in its interior. Whether these curious bodies, formerly erroneously supposed to be animalcules, pass directly through the wall of the ovum, or through an opening specially provided for their entrance, is not certainly known, although it is probable that, in some species of animals at least, the ovum is provided with an opening of the kind referred to.

When the ovum has been thus impregnated, conception is said to have taken place. It is not certainly known whether, in the human family, conception occurs in the uterus (or womb), in the Fallopian tubes (the



THE DANCE OF LIFE — HOW CELLS MULTIPLY.

passages which lead from the ovary to the womb), or upon the surface of the ovary, where the ovum is formed. It is possible, however, that conception may occur at either one of these points.

Development. —Wherever the conception may occur, the ovum soon fixes itself upon some point on the inner lining of the womb, and the period of pregnancy begins. This period usually lasts nine calendar months, or ten lunar months, during which the menstrual flow ceases, though in occasional instances it may continue in a somewhat modified form, usually during the early months of pregnancy.

Human Affinities with Lower Animals. –During the period of pregnancy, the ovum undergoes a most remarkable series of changes, passing through various stages of development, in some of which it resembles in the most wonderful degree various lower forms of animal life. At one period, the developing human being, technically called a *fetus,* resembles, not very remotely, a partially developed chick from an egg which has been incubated for a few days. At another period, the resemblance of the fetus to that of a dog of a different age is so great that any but an experienced physiologist might readily be deceived. At one time, the extremities of the fetus resemble very closely the stunted flippers of a seal or walrus. At a certain period, its body is entirely covered with hair, like its near relative in the animal kingdom, the ape. These facts have been used by the believers in the doctrine of evolution as evidence of the common ancestry of man and lower animals. They only indicate, however,

community of design in the whole animal kingdom, rather than unity of origin.

Childbirth.—At the end of the period of gestation or pregnancy, parturition, or childbirth, occurs, and the young human being begins a more independent life, though still wholly dependent upon the mother for protection and sustenance. In some lower animals, the young are much more independent at birth than infant human beings, being prepared to begin at once the battle of life on their own account; while in other species the young are at birth still more feeble and helpless than the human infant. In the kangaroo, the fetus is born when but a few weeks old, but does not become sufficiently developed to be left out of the parental pouch, a sort of nursery bag in which the kangaroo carries its young, until nine or ten months of age.

Plural Pregnancy.—In human species, but one individual is usually born at a time; but plural pregnancies are not uncommon. Twins occur in the proportion of about one to seventy-five or eighty cases of childbirth; triplets occur not more frequently than one in five thousand cases; and plural pregnancies in which the number has reached four or five, have been reported, but are extremely rare.

Control of Sex.—There has been much speculation upon the cause of sex, and methods of controlling it. Many ingenious theories have been propounded, but none have stood the test of thorough scientific investigation. Professor Carpenter, the distinguished English physiologist, thus sums up the present state of knowledge on this subject:

"The conditions on which the differentiation of sex immediately depend, are as yet extremely obscure. M. Marc. Thury, who has paid great attention to this subject in cattle, has arrived at the conclusion (which, however, demands much confirmatory evidence for its establishment) that the sex of the progeny of a particular act of sexual intercourse is dependent upon the period of menstruation (in women) or of rut (in animals) at which the impregnation of the ovum takes place. If this occurs at the commencement of the period, the offspring will invariably be a female; if toward the close, male, the cause of the difference being the more advanced stage of maturation of the ovum in the latter case, owing to its having been for a longer period exposed to the warmth of the body of the mother.

"Ploss attributes the sex of the child to the quantity and quality of the nutriment received by the mother during pregnancy, since from a review of various countries, and a comparison of the relative numbers of males and females born, he finds that when the food is abundant and plentiful, the proportion of females rises; whilst, under opposite conditions, males are most frequent. In mountainous countries, the number of males also increases relatively.

"Preussen, however, on the other hand, considers that better and more abundant food is required by the mother for the production of males. There is strong statistical evidence that the relative numbers of males and females are in some way influenced by the relative ages of the parents.

"The following table expresses the average results collected by M. Hofacker in Germany. The numbers indicate the proportion of male births to one hundred females, under the several conditions mentioned in the first column:

Father younger than mother.....	90.6
Father and mother of equal age....	90.0
Father older by 1 to 6 years.....	103.4
Father older by 6 to 9 years.....	124.7
Father older by 9 to 18 years.....	143.7
Father older by 18 and more.....	200.0

"From this it appears that the more advanced age of the male parent has a very decided influence in occasioning a preponderance in the number of male infants; and this tallies with the fact that, taking the average of the whole of Europe, over which, as a general rule, the state and customs of society bring about a decided preponderance of age, among married couples, on the side of the husband, the proportion is about one hundred and six males to one hundred females."

Antenatal Influences. — That the character of the individual, physical, mental, and moral, is strongly influenced by the circumstances and conditions surrounding the mother during pregnancy, is a fact too well attested to be seriously questioned. The ancients seem to have been acquainted with this fact, as is shown by the method adopted by Jacob to get even with his close-fisted father-in-law. The early Greeks carefully regulated by law the conduct, diet, and other habits of life of pregnant women. They were forbidden the use of all stimulating and exciting foods, lest the unborn citizen should be injured thereby.

The disregard of this important fact is undoubtedly a prolific cause of the growing constitutional feebleness, and the multiplying physical, mental, and moral disorders which characterize the race at the present day; and unless checked, will, before the lapse of many centuries, seriously threaten its extermination. We shall not here occupy space to give in detail rules of conduct which should govern parents in respect to this matter, but simply note the following particulars:

1. As a pithy writer has said, "It is the greatest of human felicities to be well born;" and certainly to be well born is one of the most inalienable of human rights. It is evidently the duty of those who take upon themselves the responsibility of bringing new beings into the world, to see that their physical, mental, and moral conditions are such as will render it possible and probable that they may be healthfully and happily constituted, and prepared to live a happy and useful life.

2. It is unquestionably the duty of the parents to secure for the mother, during the months of pregnancy, such conditions and surroundings as will not only insure to her physical, mental, and moral health, but will encourage the development in the child of desirable traits of character, and the suppression of undesirable qualities.

That much may be accomplished by careful observance of the above particulars, carrying them out in every detail of life, has been established beyond reasonable doubt by numerous examples. The haphazard way in which human beings come into the world is a disgrace and a stigma upon our boasted civilization.

Men who devote years of study to the acquirement of such knowledge as will enable them to improve the breeds of their horses or cattle, and spend thousands in costly experiments for the purpose of perfecting and demonstrating their theories, assume the responsibility of bringing into being children who are to take their places in the world's activities a few years hence, without ever giving a moment's thought to the possible relation of causes and results in the generation of human beings. It never seems to occur to them that the same principles which are known to hold good respecting the breeding of animals, apply with equal force to the breeding of human beings. The following interesting historical case will serve to illustrate one of the laws governing ante-natal influence:

"A Roman magistrate, little, ugly, and hunchbacked, had by his wife a child exactly resembling the statue of Æsop. Frightened at the sight of this little monster, and fearful of becoming the father of a posterity so deformed, he went to consult Galen, the most distinguished physician of his time, who counseled him to place three statues of love around the conjugal bed, one at the foot, the others, one on each side, in order that the eyes of his young spouse might be constantly feasted on these charming figures. The magistrate followed strictly the advice of the physician, and it is recorded that his wife bore him a child surpassing in beauty all his hopes."

Puberty.—At the age of twelve to fourteen years, marked physiological changes occur in both sexes. Prior to this time, those organs which particularly distinguish the sexes have remained in a condition of im-

perfect development, and the distinguishing features of the general form of the body have been far less marked than they speedily become after this age. Upon reaching this period, the system seems to take a new start in the process of development, and within a few months those changes take place which transform the little boy into a young man, and the little girl into a young woman.

In the lad, the shoulders broaden, the face changes, evidences of a mustache and beard begin to make their appearance, a thick growth of hair appears in the armpits and upon other parts of the body, and there is a rapid increase in height and weight. This is a critical period for all boys, during which they should be carefully watched by their parents or guardians, as they are exposed to new dangers and temptations, and are likely to begin to go astray in ways which may ultimately destroy their happiness and usefulness. Beginning to feel that he is a man, the lad who has previously been ready and willing to consult his parents' wishes and to yield to their counsels, now often begins to think himself competent to mark out his own course of action, and is likely to become headstrong, to break away from the restraints of home, and to disregard the advice and admonitions of his superiors. Boys ought to understand that this disposition, if yielded to, will certainly lead them into danger, and will quite likely result in their ruin. It is in this way that thousands of promising lads have been led to make shipwreck of their lives.

Hygiene of Puberty.—This is a period when the physical health needs especial care. The extra demands made upon the body require an ample supply

of wholesome and nourishing food. Abundance of sleep and plenty of exercise in the open air should be secured. Boys at this period should not be kept too steadily engaged in hard work, as it may stunt their growth and weaken their constitutions for life. Constant occupation of some sort is desirable, but it should not be too monotonous. The weak muscles of a young boy will not well endure use in one kind of employment many hours at a time; but by change of work, such a lad may be kept busily employed without injury and with decided advantage. The mind should be occupied by a proper amount of study and wholesome reading; but too much reading, especially the reading of exciting and fictitious literature, should be avoided.

Curiosities of Reproduction.—While in the human species, and in many of the higher animals, but a single ovum is usually impregnated at a time, in some of the lower orders, particularly in fishes, the number of ova impregnated, or spawned, at once is sometimes prodigious. For example, it has been estimated that more than nine million eggs are sometimes spawned by the codfish during a single season.

Nature seems to have been very judicious in the distribution of reproductive powers, since sharks and other carnivorous inhabitants of the sea produce but very few eggs; while the vegetable-eating fishes reproduce prodigiously. Harmless and vegetable-eating animals, such as the rabbit and the guinea-pig, breed much more prolifically than carnivorous animals, like the lion, panther, wolf, etc.

The different modes of impregnation of the ova to be observed in different classes of animals are very interesting. In the lowest orders of animals, contact between the sexes seems to be the exception rather than the rule. The eggs of polyps, corals, and allied classes of animals, are sown broadcast upon the waves, where a certain number of them meet by pure accident with the fertilizing element required for their impregnation.

The female fish, in the spawning season, scatters her eggs among the rocks of some sheltered bay, or along the gravelly bottom of a river. During this season, she is closely followed by the male, who scatters in the same place the sperm, by which the eggs are fertilized.

The cuttlefish deposits its black eggs in masses, which look very much like bunches of grapes, the eggs being held together by glutinous strings, which serve also to fasten the masses to the stems of marine plants, rocks, or floating objects.

The egg of the shark is a sort of leathery sac, shaped much like a pillow-case, having attached to each corner a spiral filament, by means of which it becomes entangled among the seaweeds at the bottom of the sea, and is thus saved from being washed ashore by the waves.

That curious creature, the argonaut, carries its eggs with it, securely lodged in the little nooks and crannies of its shell.

Some of the mollusks arrange their eggs in long, gelatinous ribbons, which they glue to the stems of seaweeds and the surface of rocks. The common whelk arranges its eggs in little bundles containing several

eggs apiece, wrapping each bunch in a tough covering, and joining all together in large bunches, which are often washed ashore by the waves.

Remarkable Reproductive Processes. — Some very remarkable phenomena are observed in the reproductive processes of insects. For example, the seventeen-year locust bores holes in the tender twigs of trees, in which it deposits its eggs, then leaving them to care for themselves. In due time the eggs are hatched, and the young, after going through several "moults," bury themselves in the ground, reappearing only after the lapse of seventeen years, during which time they undergo various transformations.

A peculiar worm carries her thousands of eggs on her back, buried in a mass of mucus. After a time the eggs hatch out, and then there appears the curious spectacle of a mother with a whole population of young ones, numbering many thousands, growing on her back.

Even the starfish, one of the lowest forms of life, has a care for its eggs and its young. The former it surrounds with its suckers, and carries them about with it; and if they happen to float away, it will carefully gather them up again.

Reproduction without Sexual Union. — In some cases, an enormous multiplication of the species seems to take place, under some circumstances at least, without the union of sexual elements. For instance, a polyp may be divided into many pieces, and each piece will in time develop into an independent and perfect polyp. Indeed, the animal seems to multiply its species, to a certain degree at least, by throwing out buds, which

gradually separate from the parent mass, and become independent animals.

Even in lizards, lobsters, and some fishes, this kind of reproductive power seems to be present in a degree. In some species of fish, if the tail happens to be lost by accident, a new one will be grown on. If a lobster or a lizard happens to lose one of its legs in a fight with an enemy, in a few weeks it grows on an entirely new member as good as the old one. Some species of earthworms may be cut in two without destroying the animal. Indeed, each half will become an independent worm, one portion growing on a head; the other, a tail.

Mongrels and Hybrids.—Sexual unions usually take place only between individuals of the same race or species. The progeny which result from union of individuals of the same species, but of different races, is called a mongrel. All the various crosses between different races or varieties of dogs are mongrels. The mulatto is a mongrel, being a mixture of the white with the black race. Mongrels are quite readily obtained, and are found to be equally as fertile as their parents.

A hybrid is the result of union between individuals belonging to different species. We have many examples of hybrids among flowers, but unions of this sort among animals are much more rare. It is thought by many naturalists that hybrids never occur in nature, as it is only with difficulty that they can be produced, even by the intelligent aid given by man in securing fertilization.

The mule is a hybrid, resulting from a cross between the horse and the ass. The hare and the rabbit have also been crossed, producing leporides. In South

America much attention has been given to crossing the goat and the sheep, producing an animal called a chabin, the peculiar fleece of which is highly prized.

The mule, as is well known, is not fertile, and it is noticed that the chabin soon runs out, or loses its peculiar characteristics, requiring frequent renewal by original crossing.

Monsters.—Sometimes the process of development going on in the fetus during pregnancy is interrupted or deranged so as to leave some organ deficiently developed, or developed to an excessive degree. By this means, various strange deformities are produced, varying in extent from a simple webbed condition of the fingers or toes, or a deficiency in the upper jaw, known as hare-lip, to cases in which the legs are absent, the feet being joined directly to the body, or those horrible cases in which the head is lacking, or so fearfully transformed as to resemble some lower animal much more than the human form divine. The appearance of these strange-looking creatures has given rise to the popular notion that they are the result of a sexual union with some lower animal. This is, however, entirely incorrect, as nature has placed a safeguard against such an amalgamation by rendering conception between animals of such different species, quite impossible.

Hermaphrodites. — Those unfortunate creatures known as hermaphrodites, are the result of excesses or deficiencies in the development of the sexual organs. They are not really a compound of both sexes, as is generally supposed, but are simply deformed males or females, the deformity sometimes being of such a character as to render it difficult to determine to which sex

the individual belongs. It should be mentioned, however, that one or two cases have been recorded in which an individual possessed the characters of a male upon one side, and of a female upon the other. In a single instance an individual has been found to possess, in entire, but rudimentary form, both male and female organs.

An example of a hermaphrodite female is to be found in the mate of a male calf when a cow gives birth to twins, one of which is a male. Such an animal is known as a freemarten.

Among the lower orders of animals there are many species, the individuals of which are natural hermaphrodites in the proper sense of the word, possessing all the characteristics of both sexes. In some instances, the union of two individuals is necessary for impregnation, as is the case with the snail; but in other cases, as in the oyster, self-impregnation occurs.

THE BODY TEMPLE

EVERY man is conscious of the fact that there is something about him, within him, in addition to the mere anatomical structure which he can see with his eyes. There is an invisible force, an energy, an intelligence, of the operations of which he is continually conscious. A deeper study of the subject shows the presence of two distinct intelligences which exercise control of bodily movements and operations.

The Two Wills.—The study of the human body clearly sets before us the fact that there is in the body an intelligent power, ever at work, presiding at all the functions upon which life directly depends,—circulation, digestion, respiration,—carrying on these essential activities while we are asleep as well as while we are awake, repairing, cleansing, replacing, creating, pouring in a constant stream of energy and life, renewing, strengthening, building, rebuilding, all independent of the human will or personality. The regulation of the body heat, the function of perspiration, the acts of sneezing, coughing, and other defensive acts, are all indications of the working within the body of a personality, a will which is distinct from the human will or personality, a being which shows its superiority to that

of man by the fact that its vigilance is never relaxed, it "neither slumbers nor sleeps;" also in that it carries forward those bodily functions which are essential to the body's welfare, not only without the assistance of the human will, but often in spite of opposition therefrom.

A man may hold his breath for two or three minutes, but he is obliged at last to yield to the instinctive demand for air. The strongest effort to restrain the movements of the chest fails. The respiratory center, or rather the will behind it, seizes the reins of control, and compels the chest to expand.

One cannot by any effort of the will suppress the perspiration or produce a chill. One cannot awaken himself when he has fallen asleep, neither can he compel himself to sleep, though he may much desire to do so. Before we conclude that this will which operates within the body independent of the consciousness is of an order below that of the human will, let us recall further some of the wonderful things which it does,—the miracles of digestion and of heart action; the creation of millions of blood corpuscles every second to take the place of those which die, and the disposal of the millions of dead bodies of those which have perished; the wonderful miracles of sight, hearing, smell, taste, and feeling; and that greatest miracle of all, the building of the body itself from a minute speck of life to the adult man or woman.

This will, this power, outside of the human consciousness, by means of which all these marvelous miracles are performed, can be nothing less than the power which made the worlds, and which rules the

universe, a fact which Job recognized when he said, "The Spirit of God hath made me, and the breath of the Almighty hath given me life." Job 33:4. Moses, in his wonderful song, complained of Israel that they had "forgotten God that formed them." The inspired Word thus teaches us not only that God formed the first man, but that it is by the same infinite power that every man has been formed, and this process of forming, creating or re-creating is continually going forward as long as life continues; for the body is continually renewed.

The human body, then, represents an instrument, a harp of a million strings, at which two players preside, the one human, the other divine; the one fallible, erring; the other, infallible, unerring. When these two players move in harmony, the song of life is sweet and melodious, a symphony; when the human player strikes even one discordant note, the harmony is broken, the melody is spoiled.

The one thing needful for success, for happiness in life, is to live in harmony with God, to keep in tune with the Infinite One, to make the human will conform in every purpose, in every voluntary thought or act, with God's order of life as revealed to us by the divine voices which speak to our hearts, by the teachings of experience, and by the instruction of Holy Writ.

To live in tune with the Infinite One is to walk with God; it is to be in harmony with all the laws of being, physical and mental; it is to live at peace with one's self, as well as with the world about him. "Her ways are ways of pleasantness, and all her paths are peace." Prov. 3:17.

The man whose stomach is the seat of fermentations, putrefactions, gaseous commotions, and chemical reactions, suffers burnings, pains, pangs, aches, twinges, depressions, and miseries of various sorts. He is out of tune. He is not in harmony with God. He is at war with him, either consciously or unconsciously. The man whose mind is full of forebodings, worries, doubts, and suspicions, is equally out of tune.

"Thou wilt keep him in perfect peace, whose mind is stayed on thee." Isa. 26:3. To have one's mind stayed on God is to be ever studying his will, and earnestly endeavoring to do his will as revealed to us in the Bible and the book of nature, and even in our own bodies. We are not competent to care for the temple of the body unless we study it, unless we seek earnestly to become acquainted with all its parts, and to know their several needs, and to find the divine method of satisfying them.

We are often out of tune with Heaven because we foolishly attempt to draw a line of distinction between physical duties and spiritual duties, forgetting that everything physical which has a relation to the well-being of the temple has a spiritual significance. Life is a unit, not a duality. It is impossible to divide life into a spiritual and a physical part. There is but one life, and that is the life of God. As manifested in man, this life presents various phases, which we call physical, mental, moral, or spiritual; but these all spring from one fountain, and are as necessarily related as the several branches of a tree. Nothing could be more absurd than to imagine that the highest welfare of one can be secured while neglecting the interests of the

others. As well might two players at a single instrument expect to produce melody by taking care to harmonize a portion of their chords, while striking discordant notes in others. Every note must harmonize.

The whole human life, physical, mental, and moral, must conform to the great decalogue which is written upon the human constitution itself, and which is revealed to us through nature, the inspired Word of God, and in human experience. The highest of all attainments is to reach a state of absolute harmony with the Infinite One, to bring the truant human will into perfect accord with all the principles which govern mental, moral, and physical action, including eating, drinking, exercise, and every other physical relation of life, as well as those obligations which are commonly denominated "Christian duties," but which include but a very small part of our moral obligations.

Every intelligent human being who recognizes this great truth, the universal unity of being, the absolute and incessant dependence upon the infinite indwelling power, will no longer be able to call some things sacred, other things common. All things become sacred.

Eating and drinking are but the means by which the waning life of our bodies is reinvigorated and maintained, the vital fire rekindled by daily demands upon God's great storehouse of life and energy, the products of the vegetable kingdom, prepared for use by man and kindred beings likewise endowed with life.

Man has no power of himself.

All the energy which he exhibits in his actions, good or bad, comes to him direct from the source of all energy, is loaned to him by God. That he is able

to direct it, thus making God to serve in his conduct, whether it be good or bad (Isa. 43:24), is due to the fact that the Creator of all the universe bows his neck to the yoke of labor, carries all the burdens, performs all the toil for all his creatures, in order that each may fulfill his mission in the world as representing some divine thought or purpose, and for man especially that he may be a fit representative of the God who made him, a true witness to the world and to the universe of the power that dwells within, a noble image of the personality which conceived him, and modeled him from clay, and animated him by making him the temple of his life and power.

The Infinite Personality.—All about us in the world and in the universe there are overwhelming evidences of an all-pervading, all-controlling personality. The regular rotation of day and night and of the seasons, the movements of the planets and the distant stars, the phenomena of plant life, all speak to us in unmistakable tones of a great Designer, a personal being, working constantly and everywhere in nature, of whom nature is the expression. Physicists tell us all about the transformations of energy, the change of force from one form to another, of the conversion of light into heat, of heat into electricity, of electricity into magnetism, of magnetism into mechanical work, as in the operation of the motors which run our electric cars; but ask the wisest physicist on earth whence comes the energy of the sun, the universal power of gravitation, or what is the original source of energy, and he will confess that these questions are beyond the limits of his science. He will admit that he can find no better expla-

nation than that of the psalmist, who declared, "Power belongeth unto God."

That the power behind, in, or beneath all the operations of nature is not simply a blind, unintelligent force, is clearly enough manifested by the evidences of intelligence displayed in every object and operation of the natural world. A skeptic, walking one day across the plains of Texas, picked up a little flower known as the Texas star. He counted its five petals, its five stamens, its five green sepals, and then asked himself the question, "How did it happen that this little flower should have exactly the same number of stamens, petals, and sepals?" Applying the doctrine of chance, multiplying together the three fives, he found that there was but one chance in one hundred and twenty-five that such a combination would occur. But right about his feet he found a hundred such stars, and each one with five stamens, five petals, and five sepals. The probability that chance should have produced a hundred such flowers was but one in twelve thousand five hundred; but as he cast his eye over the plain, he saw that here were not only one hundred, but hundreds and thousands of millions of such stars, and that every year for ages, millions upon millions of these flowers had been produced, always the same. He recognized the overwhelming weight of the argument. That such a thing could come by chance was utterly beyond belief. The only consistent conclusion to which he could come was that the Texas star was the product of a designer, a personality, a power, capable of planning and executing on a scale beyond all human calculation. Then as he thought of the stars overhead,

and the incalculable distances which separate them, the infinite number, the infinite space through which they are scattered, yet all bound together in one vast system by a force which every instant thrills and pulsates throughout the limitless bounds of infinite space, without an instant's loss of time, not overlooking a single grain of sand, the smallest atom, so that suns so far apart as to be invisible still keep time; when he reflected upon this majestic manifestation of infinite power beneath his feet and spread out in the blue universe over his head, he was compelled to exclaim aloud, "There is indeed a God who knows all and rules all."

The Intelligence Displayed in the Natural World. —It is exceedingly interesting to note the manifestations of mind in nature, even in inanimate things. Observe the nice balance between the weight of the air and that of the smoke, by which the poisonous gases are carried upward in a gentle rising cloud, while the pure air clings to earth where it is needed for the support of animal life. Note the remarkable arrangement by which, in the freezing up of rivers and lakes in the fall, enormous quantities of heat are given off by the water in the formation of the ice, thus modifying the temperature of the chilly air, and so graduating the change from summer to winter; and again in the melting of the ice in the spring, the same quantities of heat are absorbed from the air, thus favorably modifying the oncoming summer's heat, which otherwise might become too intense. The minutest details of nature exhibit these wonderful adaptations and intelligent provisions in which are manifested a common sense, an adjustment of means to ends, which are entirely

akin to the same faculties manifested in the operations of the human mind.

In other words, man recognizes that the great mind is in many respects like his own, only vastly transcending it.

Man's Kinship with His Maker.—The more one learns of nature, the more deeply one looks into the secrets of God's creative work, the more clearly does one recognize the kinship which exists between the human mind and the infinite, between the higher and nobler manifestations of human thought and the divine thoughts which are expressed in the sunlight, the clouds, the flowers, the trees, the fields of waving grain, the fragrant meadows, the rushing torrent, the heaving ocean, the whole moving, speaking universe about us. In many of the operations of nature we find illustrated arithmetical and geometrical principles as clearly as in the scientific treatises upon these subjects. Indeed the science of mathematics is only a study of the principles which exist in nature, and which man has not created but has only discovered. Surely there is manifested a marvelous ingenuity, a common sense which transcends the human common sense, which is common in kind though far exceeding human qualities of the same sort.

And again, we are reminded of the remarkable declaration of the apostle in his impressive address to the Athenians, that "we are also God's offspring." Acts 17:29. While the whole human race has wandered far away from uprightness and naturalness, so that man has lost his high estate and become perverted, deformed, debased, and full of iniquity, the fact still

stands that he is a son of God; and the invitation is ever held out to him to recognize this sonship, and to avail himself of its privileges by accepting his Creator as his master and ruler, by placing his mind and all his intellectual powers, his emotions, and every faculty of his being which is under the control of his will, under absolute submission to the divine will; so that the same beneficent Intelligence which unerringly and unceasingly guides and guards his heart, his stomach, his liver, and other of his bodily organs, may preside with equal constancy over all the activities of his brain, directing all his conscious movements, actuating all his plans and motives, thus taking possession of the temple, and making him in the highest sense a member of God's family, a son fit to stand as a representative of his Father and his Maker. Sinning man is still a son, although an erring, wandering, prodigal son. A sincere Christian is a son returned to his father's house, recognized as a dutiful and obedient member of his father's family, and as a rightful heir. Luke 15:19; 1 John 3:2; Job 33:27–29.

Nature reveals to us an infinite personality, working constantly, harmoniously. The uniformity of law is due, not to the fact that the power behind is a blind, unintelligent, unreasoning force, but to the fact that the power at work in nature is possessed of such infinite intelligence that every act was perfect the first time it was done, and not being susceptible of improvement, can only be repeated. Apples are always observed to fall downward instead of upward or in varied directions. The very uniformity of nature is a strik-

ing evidence of the wisdom, intelligence, and power of the personality which presides at its heart.

Permanence in the Midst of Change.—One of the most remarkable facts of human life, is the retention, notwithstanding the perpetual change of substance, of individual properties and features.

By what means are the symmetry and proportion of the different parts of the body maintained in the midst of the continual change which is taking place hour by hour and week by week? The forefinger is always a little shorter than the middle finger; the little finger is the smallest of all, and always remains the smallest, unless it becomes swollen or otherwise enlarged as the result of disease. What is said of the hand may be said of the various features of the face,— the two eyes, the ears, and all the corresponding portions of the two sides of the face and of the body. The preservation of the form and symmetry of the body in the midst of the perpetual change of matter which is constantly taking place, is truly a most remarkable fact, and should cause us to pause a moment, and consider by what means is maintained this wonderful stability in the midst of perpetual change.

In this permanence of form and feature we have a physiological proof of the existence within the body of some power superior to the material composition or substance of the body, which exercises a constant supervision and control whereby individual identity is maintained. This can be nothing less than the Power which builds, which creates. As Lord Herbert has well said, "Whoever considers the study of anatomy, I believe, will never be an atheist; the frame of man's body and the coherence of its parts are so strange and paradox-

ical that I hold him as the greatest miracle of nature."

The apostle plainly says, "Because that which may be known of God is manifest in them; for God manifested it unto them. For the invisible things of him since the creation of the world are clearly seen, being perceived through the things that are made, even his everlasting power and divinity; that they may be without excuse." Rom. 1:19, 20. R. V. God gives us the proof of his existence, the evidence of his presence, in the marvelous phenomena of life which presents to us a perpetual miracle, a spectacle of creative power in actual operation.

We have not to look back many thousands of years to the beginning of the world's history to find evidence of divine creative skill and power. The Bible record of the creation of man out of dust is confirmed by the teaching of true science, especially the science of biology. We constantly behold the miracle of creation wrought out before our eyes in the growing of forests and fields of grain and all the products of the earth, which, as at first, are made of dust, in the development of a human being from infancy to adult age, and the maintenance of individual identity from year to year.

"The heavens declare His handiwork." There is only one complete, clear, and satisfactory explanation of the marvelous phenomena spread out about us in the visible universe, namely, an Infinite Intelligence, working out His purposes. God is the explanation of nature.

As one stands gazing up into the heavens on a clear, starlit night, he is overwhelmed with the immensity of the handiwork of God. There are five thousand visible stars, and every star a sun; but this is but the beginning

of the celestial galaxy. Three-fourths of the light received from the sky when the sun and moon are absent comes from stars which are invisible. So numerous are these that when a telescope is pointed at a little constellation called "The Twins," composed of six visible stars, more than three thousand glowing suns appearing as little points of light may be easily counted. In the Milky Way alone, the system to which we belong, there are eighteen millions of stars and there may be millions of other systems unknown to us. One is tempted to believe that the number of stars must be infinite, but a single consideration seems to forbid this idea. If the stars were really infinite in number, the whole sky would be luminous, and would be brighter than the densest portions of the Milky Way. This is by no means the case. There are, indeed, certain portions of the sky in which even the strongest telescopes reveal comparatively few stars, and at a point near the south pole star and that beautiful constellation, the Southern Cross (see accompanying cut) there is a spot in the heavens, known by sailors as the " coal sack," in which the most powerful telescope has never been able to discover even the faintest glimmer of starlight.

The distance of many of these stars has been approximately determined by means of some remarkable inventions of recent years. A few of our very nearest neighbors are at such distances that light traveling at the rate of nearly two hundred thousand miles a second is able to reach us in a little more than three years. Others are known to be so far away that several thousand years are required for their light to reach us. From this it is evident that He who knows all sees

not by the aid of light, but by the fact of His universal presence.

Our nearest celestial neighbor, the moon, receives light reflected from the earth in one and one-fourth seconds; but the sun is so far away, 92,500,000 miles, that at sunrise it has already been up eight minutes before we are aware of the fact. An hour or two suffices to bring to us the light of our most distant planet neighbors.

There are constantly taking place celestial and terrestrial phenomena which assure us of the nice balance by which creative power maintains the worlds in safe and comfortable equipoise. The earth is as nicely poised in space as a soapbubble floating in the air, and is so perfectly regulated in its rotation around its axis that according to Laplace, it has not lost one one-hundredth of a second in two thousand years. Some years ago the earth's balance was so seriously disturbed by an earthquake in Peru that a tidal wave thirty feet high created by the sudden upheaval of the earth's bottom, was sent six thousand miles across the ocean to the Sandwich Islands at the rate of five hundred miles an hour.

The rotation of the earth is so rapid (more than seventeen miles a minute) that it cannot exist as a perfect sphere, but is flattened at the poles, the diameter being twenty-six miles greater at the equator than through its axis. This centrifugal movement by which bodies have a tendency to fly off the surface of the earth, enables the Mississippi River to flow up hill to the extent of over three miles in its course from its source to its mouth.

The X-ray and Radium. — The remarkable discoveries in physics that have been made within the last few years are a great shock to the self-complacency of those philosophers who have imagined that the atomic theory and the Darwinian hypothesis solved all the mysteries of matter, dead and living. The atomic theory, though serving the chemist a useful purpose as a working hypothesis, has for many years been growing weak in its knees as a lucid explanation of phenomena. The discoveries made in relation to light and electricity have shown clearly enough that there must be something associated with matter quite different from ordinary atoms and molecules as understood by the atomic theory. The ether hypothesis has helped to piece out, but this, too, has fallen short. Now the X-ray and the Becquerel ray, and other phenomena are brought forward with an array of phenomena which quite unsettle things for the chemist and physicist, and leave us all at sea respecting the ultimate constitution of things.

The discovery of a light that could penetrate such opaque objects as a hard-wood plank, two or three inches thick, and even thin sheets of metal, was sufficiently startling; but then the X-ray was produced by the electrical current, and we have become accustomed to look upon electricity as a sort of scientific wizard, and to expect new and startling things from those engaged in the study of this agent. It was not long, however, before the discovery was made that the X-ray, while opening to view the most obscure nooks and corners of the body, even penetrating the largest bones, and revealing the movements of the heart and lungs,

and thus rendering the greatest service to surgeons and physicians, was at the same time a powerful agent for mischief, causing deep sloughs of the skin when too long applied, which showed great obstinacy in healing. But then this very baneful property was soon turned to good account in the treatment of certain parasitic skin diseases, particularly lupus.

But now comes the surprising discovery that the X-ray is not the result of any human invention, that it is not dependent upon electrical machines nor electricians, but that it is widely produced in nature, that the aurora borealis may be a manifestation of this marvelous force emanating from the sun.

The discovery has been made that there are earthy substances closely resembling lime or chalk in appearance, which as found in nature, and without manipulation of any sort, are constantly giving off rays in great quantities. Two of the substances, barium and uranium, have been long known to chemists; but a new substance, radium, has recently been discovered, which possesses this property to an extent ninety times as great as any previously known.

Radium throws off heat as well as light. A mass of it remains always at a temperature several degrees above the surrounding atmosphere.

The spectacle of light and heat coming out of a cold, opaque body like chalk, opens a field for scientific speculation not likely to be soon exhausted. It may be that the scientific world will discover at last that the inspired Word which declares, "God is light," is a simple statement of a profound and fundamental scientific fact.

Waste and Repair

THE fact that the human body is always warm is evidence that there is within it a vital fire burning and ever-consuming. The body temperature is constantly maintained at about 100° F. internally.

In some animals, as certain birds, the temperature is higher, even as high as 110° to 112°, while in animals said to be cold-blooded, as fishes and frogs, the temperature varies with that of the water or air with which the animal is in contact, but in cool water the temperature of the animal is always a little above that of the surrounding medium.

What is the source of this *heat,* called "animal heat," which is always produced in the living animal body? It is the vital fire or combustion carried forward within the body under the control of the presiding Intelligence which carries forward all the bodily functions, and cares for all its needs.

The amount of heat produced by the body has been estimated to be sufficient to raise two and one-half pints of water from freezing to the boiling point, every hour, or to boil seven gallons of ice water every twenty-four hours. The body gives off about the same quantity of heat hourly as does a foot and a half of one-inch

iron pipe filled with steam. This is about the same amount of heat as would be produced by the burning of two-thirds of a pound of coal, although, to produce the same result, a much larger amount of coal would be required; as a large part of the heat produced in the burning of coal for heating purposes is wasted in passing up the chimney, or by radiation to surrounding objects.

As another comparison, we may say that the amount of heat generated in the body is about the same as that which would be produced by a small kerosene lamp capable of burning two thirds of a pint of oil every twenty-four hours, or by the continuous burning of a couple of ordinary candles. Wherever heat is produced, something must be consumed; consequently the vital fires consume the body just as burning consumes a candle or the fuel in a stove. We see, then, that the poetic reference to life as a "flame" is, after all, a scientific expression of a fact. Life is truly a flame, a consuming fire, and the body is the substance which the flame consumes.

"Life is a pure flame, and we live by an invisible sun within us."— *Sir Thomas Browne.*

How this burning is carried forward is one of the so-called mysteries of science which no one has undertaken to explain. The fire which burns in the body consumes the food as a furnace consumes fuel, while at the same time leaving absolutely uninjured the most delicate nerve filaments, the most fragile threads of living protoplasm. This fire is not such a burning as man may kindle, an ordinary chemical combustion, a destroying flame, but is a vital fire kindled by him who

created and who maintains body temple by supplying to it his own life and energy so long as the temple stands. When at death the tottering walls of the temple fall, its altar fires are quenched, and only ashes remain.

Waste from Work.—Another most important source of bodily waste is work. Work always involves the consuming of substance, just as heat does. The locomotive cannot pull its train of cars without the consumption of coal, and the locomotive which consumes the most coal pulls the largest train, other things being equal. The amount of fuel consumed is always proportionate to the amount of work done. In the case of the locomotive, the fuel is carried in a special receptacle, the "tender." In the living temple, the body, the temple itself is consumed by its work. The amount of work which the body is capable of doing daily has been carefully estimated, and has been found to be equivalent to the lifting of nine hundred tons one foot high. More than one-seventh of this work (124 tons) is performed by the heart in circulating the blood. About an equal amount of work is performed in the movements of breathing. The balance of the work is done by the muscles of the limbs and trunk. To perform this work in ten hours, a man would have to lift more than forty pounds per second, or eleven pounds four feet high per second, or his own weight a foot high every three seconds. This work, performed by the legs alone, would require a man to walk more than one hundred miles in twenty-four hours, or to lift himself up a perpendicular ascent of five miles.

Waste from Work

The amount of work which a man does in a single day of hard labor is equivalent to lifting 1,400,000 pounds one foot high. The energy actually consumed by the body is five times this, or practically the equivalent of 7,000,000 foot-pounds of energy, or a little more than the amount of work which would be done by a one-horsepower engine working for three hours. From the above facts, it is very evident that the body is continually consuming energy.

It is evident, then, that the maintenance of vital activity requires a constant supply of living substance to take the place of that which is consumed in work and heat production. A beneficent providence has provided for this imperative need in the substances which are commonly called "food," especially those furnished by the vegetable kingdom.

Just here, it will be well for us to pause a moment, and consider the important and characteristic difference between plants and animals. The plant is a storehouse; the animal, a living machine. The plant gathers energy; the animal expends energy. The plant derives its energy from the sunlight. It is only under the influence of the sun's rays falling upon the leaves and the bark of the plant that the energy locked up in the air and earth and water is molded into forms which render it available for use in the animal or the human body; in other words, it is the creative, miracle-working power of the sunlight which produces those substances which are capable of being received into the body, or, being builded into the walls and pillars of the myriad delicate and intricate structures of the wonderful temple which we call the body. The light which

comes from the sun is energy,— not simply sun energy, but divine energy. The great apostle enunciated this basic, physiological, and theological fact when he wrote, "God is light." 1 John 1:5.

The light does not simply fall upon the tree, it enters the tree, it becomes a part of the tree.

We have proof of this in the fact that we have only to raise the temperature of wood a few hundred degrees to see the light shine out again in the glowing brilliance of coal and flame. We have a somewhat more complicated, but wholly apt illustration in the electric light. The plant which grew and stored sunlight hundreds of years ago is burned in the furnace of a steam boiler; an engine is set in operation, which propels the dynamo. The dynamo sends out an electric current, which heats a filament of carbon in a glass globe, and in the glowing spiral we see shining out the veritable sunlight which, ages ago, fell upon the huge ferns and pines from which the coal was formed. A lump of black coal, then, is a storehouse of sunlight, only needing the application of heat to cause the light to shine forth with all its original warmth and brightness.

Every vegetable product is such a storehouse. Every fruit, every seed, every nut, is a little bundle of concentrated light stored until it is needed for use in the growth and development of a plant, or for the service of our temple bodies, or to furnish heat and energy to some member of the animal kingdom. It is just as impossible for an animal to gather in stores of life and energy from the original sources of supply—sunlight, the earth, the air, as it is for a vegetable to make use of or to expend energy in work. Birds fly. Some

vegetables or vegetable seeds have wings, but they are only driven by the wind; they do not fly. Flowers have lips, but they do not speak. Trees have arms, or limbs, but they move only when swayed by the breeze. Vegetables store energy; animals expend it. The plant is a storehouse; the animal a living, divinely devised and constructed machine.

The Breath of Life.—It is a significant fact that in the beginning of things, one of the first acts was the sending forth of light: "And God said, Let there be light: and there was light." Light is the vehicle of energy to all living things; it is the means by which God enters into animate nature. The glorious sunlight which garnishes the sky, tints the flowers, paints the rainbow, and glistens in the dew, is creative power at work. It is this glorious light which vitalizes all living things by ts warmth. It is a propelling power in the universe. It is the light, with its accompanying heat, which lifts the water from the lakes, rivers, seas, and dew-moistened grass and leaves to form clouds, and thus maintain the never-ceasing flow of life-giving water which comes down from the heavens in falling rain and dew.

Light is, to man, one of the most powerful of all vital stimulants. It brightens the temple as it shines upon its walls; it heightens its colors and stimulates its activities; but there is no provision in the body temple, as in the plant, whereby the sunlight may be captured, held, and stored for future use. Light stimulates the consuming activities of the vital machine. This it does by increasing the appetite and the digestive power. Appetite is nothing more than a disposition

to draw upon nature's storehouse for a new supply of living substance.

The reader must not consider that the statements above made or the language employed are intended to be considered as in the slightest degree figurative. It is the purpose of the author to express his thoughts in the plainest and most literal language at his command. We cannot understand nature, neither can we understand God, who speaks to us through nature, unless we lay aside all prejudices and preconceived notions, and turn a deaf ear to that twice-confused Babel of tongues, systematic theology, with its paradoxes and mysticisms and absurd hypotheses and reason-baffling tests of faith, and sit, as a humble listener, at the feet of Him who says, "Thine ears shall hear a word behind thee, saying, This is the way, walk ye in it." Isa. 30:21. The great Teacher is speaking to us to-day just as truly and as really as when, clothed in human form, he walked the earth nineteen hundred years ago. But, to receive the thought of him who said, "I am the way, the truth, and the life" (John 14:6), we must empty ourselves of those hindrances to the receiving of truth which are merely man-made inventions, and which obscure rather than assist spiritual insight into God's thought.

Bread is recognized as "the staff of life." It can be such only because it contains material capable of being in the body converted into living substance. Bread must contain life in order that it may communicate life. The same rule applies to all food substances. Nothing can be a food unless capable of becoming a part of the living body; for food and the act of eating are simply divinely appointed means of

NATURAL FOOD BOYS

supplying the body temple with living substance which may take the place of that which has been consumed. But only those things can be so employed which are *living* substances, or the product of vital activity; in other words, stored sunlight, for this is the only possible source from which the body can derive heat and energy. Substances from which the light has been given off can be of no service. We see, also, that the purpose of eating cannot be the mere gratification of the appetite, the enjoyment of the agreeable sensation which food produces in the mouth and throat as it passes through them, but that it has a higher purpose — the illuminating and energizing, the vitalizing and renewing of the living substance of the body, in which and through which God's life and energy are displayed. Nevertheless, eating is agreeable, and it is right that the taking of food should be enjoyable, but only for the reason that the beneficent Creator has so arranged that his ways are ways of pleasantness, and all his paths are peace (Prov. 3:17), when man walks after the divine order.

The Natural Diet of Man.—While it is true that various food elements required for use in the body may be obtained from both the animal and the vegetable kingdoms, it is by no means to be supposed that it is a matter of indifference from which source their food is derived.

Granting, then, that man's natural dietary is derived from the vegetable kingdom, we must still recognize the fact that all vegetable products are not equally well adapted to support human life and activity. In Gen. 1:29 we read, "Behold, I have given

you every herb bearing seed, which is upon the face of all the earth, and every tree, in the which is the fruit of a tree yielding seed; to you it shall be for meat." The most thoroughgoing scientific research upon this question leads most certainly and unequivocally to the conclusion that the dictum of Holy Writ in relation to man's diet is the expression of a profound biological fact. Many eminent authorities who have studied this question exhaustively have borne testimony to this fact.

The most positive confirmation of these views is to be found in the undeniable fact that a large part of the human family have, from the earliest times, subsisted upon foods of vegetable origin, chiefly of fruits, grains, nuts, and other seeds. At the present time, these substances constitute the principal sustenance of at least two-thirds of the entire human family. The three hundred millions of India subsist almost exclusively upon rice and *dahl,* a species of lentil, with a little oil, and sometimes melted butter, but preferably the oil of sesame or some other seed. The same is almost equally true of the four hundred millions of China and Siam, and the scores of millions which occupy the central portion of the Dark Continent, who live chiefly upon fruits and nuts and other natural vegetable products of the forest. The cocoanut, the plantain, and the banana form a very large proportion of the dietary of the natives of Central America, the West Indies, and the widely scattered islands of the Pacific. Only Europeans and a few savage tribes subsist to a very large extent upon animal foods, and it is perhaps true that coarse vegetables, such as the

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cabbage, spinach, celery, and other woody stuffs, are more generally used by Europeans than by any other class of the human race, with the exception of a few degraded and belated tribes who, for lack of other better food, live upon roots, insects, and reptiles, and are reduced to a state but little above that of the beasts of the field.

One of the first evidences of gastric enfeeblement is the inability to digest vegetables. Cereals, when properly cooked, are very quickly digested. Fruits are served up by the hand of nature already digested, requiring only thorough mastication to secure their rapid passage through the stomach to the absorption reservoir below. Nuts, an extremely concentrated food, are readily digestible when thoroughly masticated, so that their firm structure is reduced to a creamy paste. Vegetables, however, like meats, are slow of digestion, because of the large amount of waste and indigestible substance which they contain.

It should be noticed, also, that fruits, grains, and nuts always harmonize together in almost any sort of combination that can be devised, whereas there is often a disagreement between vegetables and other food substances, particularly fruits. This is certainly a strong hint that vegetables proper were never intended for human dietary. It should be understood that by "vegetables" is intended those coarse, woody substances other than the seeds or seed-bearing portions of plants. This class includes buds, as the cauliflower; stems, as celery, asparagus; underground stems, as the potato; roots, as the turnip, beet, carrot, and parsnip; and leaves, as cabbage, lettuce, and spinach. Of

these various products, the potato most nearly resembles the cereals, and it may be said in its favor that its starch is even more digestible than the starches furnished by the cereals. The question of cookery, however, must be taken into consideration. There is no doubt that thorough cooking wonderfully increases the digestibility of vegetables, so that by the aid of this process, which is a sort of predigestion, we are able to make use of many food substances which otherwise could be eaten only at the risk of very great injury.

SHALL WE SLAY TO EAT?

THE question is not, "Is it possible to subsist upon the flesh of animals, and live?" but, "Is it natural, wholesome, and wise so to do?" In other words, is it in harmony with the divine order of life for man to slay to eat? We have not space in this small volume to enter into a full discussion of this question, as has been done elsewhere.* We shall merely undertake to summarize the facts of science and experience in relation to this great question, and to draw such instruction as we may from the teachings of Holy Writ.

The diet of every class of animals is adapted to its structure and to its needs. This fact is so clearly recognized, and so thoroughly understood by scientists, that any competent anatomist will undertake to tell at once from the skeleton of an animal, even though it be to him a new one, the exact nature of its diet in its natural state and the general structure of its digestive organs. Let us note some of the peculiarities of the different classes of animals in this regard.

Herbivorous Animals. — Herbivorous animals, which subsist upon grasses, twigs, leaves, and other coarse herbage, necessarily require a very capacious and very complicated digestive apparatus. Their

*"Shall We Slay to Eat?" by J. H. Kellogg, M. D. Good Health Publishing Company, Battle Creek, Michigan.

teeth are formed for nipping and crushing the coarse herbage on which they feed. The bill of fare provided for them is indicated in Gen. 1:30: "And to every beast of the earth, and to every fowl of the air, and to every thing that creepeth upon the earth wherein there is life, I have given every green herb for meat: and it was so."

Other animals, as the squirrel, monkey, and horse, also the cat, dog, lion, and other animals, which subsist upon grains, fruits, nuts, and the flesh of other animals, have a simpler digestive apparatus, consisting of a single stomach and a less complicated intestinal canal. The teeth also of these animals indicate the simpler character of their dietaries. The teeth of the squirrel, for example, are exactly adapted to cracking and picking from the broken shells the nuts and acorns upon which it naturally subsists. The teeth of the monkey, likewise, are precisely suited to its fare of nuts and fruits. The teeth of the so-called carnivorous animals, while in many respects different, still, to some extent, resemble those of the monkey and other fruit- and nut-eating animals. This fact, however, does not indicate that the monkey is by nature a flesh eater, but rather that carnivorous animals, while not originally flesh eaters, have become such because of circumstances. This fact is strongly suggested by the eating habits of the squirrel, which subsists upon nuts when they are readily obtained, but does not hesitate to prey upon small birds in case of necessity. The common house rat, likewise, while closely allied to the squirrel, and fond of nuts, also eats meat when occasion offers; although its near relative, the water

A Vegetarian Wolf.

rat, is strictly vegetarian in its habits. We must not infer from this latter fact that the water rat is living beneath its privileges, but, rather, that the house rat has acquired a new and unnatural appetite for flesh. Dogs and cats thrive upon a diet of nuts, as do other animals generally classed as strictly carnivorous. The accompanying cut, for example, shows the picture of a wolf which belonged to the author, and which, on coming into his possession, without the slightest demur made an immediate and complete change from a diet of raw flesh to a diet of nuts and cereals, consisting of crackers and protose. The animal seemed to be quite as fond of protose as of meat. Dogs and cats also take this purely vegetable product as readily as meat. The writer has often seen dogs cracking nuts with their teeth, and picking out the meat with great apparent relish.

The complicated stomach of the herbivorous animal is a wise provision which the Creator has made to enable it to make use of the great variety of foods which are included in its bill of fare. Every weed, every stem, every different shrub has characteristic properties of its own. The many thousands of plants which furnish food to this class of animals constitute a most extended and varied bill of fare. Fruits, nuts, and cereals, however, are comparatively simple and uniform in their dietetic properties, so that a simpler digestive apparatus meets the requirements. Those animals that subsist upon the flesh of other animals have also a practically uniform, simple dietary. In the world of living beings which inhabit the ocean the opposite is true. The vegetable forms are compara-

tively few and simple. Consequently those fish and water animals which subsist upon vegetables have very simple stomachs, while those animals which subsist upon other animals, as the different varieties of the whale family, have exceedingly complicated stomachs, some having as many as eight or nine stomachs wherewith to digest the different kinds of fishes and other water animals which enter their capacious maws. The existence of a complex stomach is then not necessarily an indication that the animal's diet must be vegetable in character, but rather that its dietary is complex, and requires a long and complicated digestive process. Grain-eating animals, as well as flesh-eating animals, have simple stomachs.

It is hardly to be supposed that the flesh-eating animals were originally created to be destroyers of other animals. It seems more reasonable to regard them as animals which, while originally eaters of nuts and fruits, have by the failure of their natural food supply, been driven to the eating of other animals as their only means of sustenance. A dog can readily subsist upon a diet of nuts or even cooked cereals, but cannot subsist upon raw corn or other raw grains. In fact, according to the testimony of hunters and other keepers of hunting dogs from which the greatest feats of activity and endurance are required dogs can only do their best when fed upon a strictly non-flesh dietary, consisting perhaps of cornmeal bread or similar food. Dogs thus fed have a keener scent and better wind than those which eat meat. If, then, an animal which in its natural state subsists largely, if not exclusively, upon a meat dietary becomes a more vigor-

ous animal when fed upon a non-flesh diet, are we not led at once to the conclusion that carnivorous animals are such only as the result of an unnatural state of things, which has been brought about by the failure of their natural food supplies?

Various domestic animals have been known to adopt a diet of flesh when pressed by hunger. The cows of Nantucket, for example, in the winter time, when the grass is deeply buried beneath the heavy snows, are said to dig up with their hoofs the fish skins, which lie in great quantities along the shore, and to greedily devour them. Horses and goats have been taught to eat beefsteak with an apparent relish. There can be no doubt that a diet of flesh is more nearly adapted to the needs of grain-eating and nut-eating animals than is a dietary of grass and other coarse herbage.

The Bible and the traditions of profane history clearly picture the first representatives of our race as eaters of fruits, grains, and nuts, and also more than suggest that human beings were brought to the use of flesh food only through being deprived of their original and more natural food stuffs by famine.

Plants, the Food Producers.—It is evident, then, that animals cannot be the original source of food for animals in general, nor for any animals, except to a limited extent. When one animal subsists upon another, he is only taking vegetable food at second hand.

The popular notion that lean meat is particularly valuable as a force producer was long ago recognized as an error by physiologists. The inferiority of meat as a source of food is very clearly shown by the facts presented in the following table, based upon the most

recent researches, which shows the number of food units, the measure of food value, in each pound of the substance named:

	Food units in one pound.		*Food units in one pound.*
Beef	592	Chestnuts	1062
Potatoes	435	Walnuts	3242
Milk	347	Hazelnuts	3083
Corn	1648	Almonds (sweet)	3083
Rice	1596	Peanuts	2668
Peas	1515	Cocoanuts	2694
Bread	1083	Filberts	3265

Reference to the above table shows that a pound of meat contains only a little more than one-third as much nutriment as a pound of corn, and only about one-fourth more than a pound of potatoes; while a pound of walnuts or hazelnuts contains more than five times as much nutriment as a pound of beef, hence has a food value five times as great as a pound of beef.

But flesh is not only inferior to the products of the vegetable kingdom in the quantity or proportion of energy-producing elements which it contains, but it is also inferior in quality. The proteid, or albuminoid substances, of which flesh food is chiefly composed, are only useful in replenishing or repairing the proteid wastes of the body, which are comparatively small, and are decidedly inferior to vegetable fats in energy-producing value.

The popular idea that one must eat the flesh of animals, and especially lean meat, in order to have strong muscles, is a great error. The notion that one must eat a strong animal, an ox for example, in order to be strong, is a cannibalistic idea. The savage chief eats the rival chief whom he conquers, in the belief that he may become thereby possessed of his courage, not because he is particularly fond of his flesh. The

man who eats beefsteak with the idea that he will thereby become possessed of the strength of the ox, is acting upon the same principle. Common sense would naturally lead one to suppose that if he wishes to eat for strength, he should profit by the example of the ox, and eat that which the ox eats, and thereby become strong. In other words, as the ox and the horse acquire strength from the use of corn, man may find strength in the same way.

It is from the vegetable world—the coal and wood —that the energy is derived which runs our steam engines, pulls our trains, drives our steamships, and does the work of civilization. It is from the vegetable world that all animals, directly or indirectly, derive the energy which is manifested by animal life through muscular and mental work.

When an animal is killed by cutting its throat or shooting it through the head, its entire body does not die instantly. It loses consciousness, its heart ceases to beat, its individual or somatic life ends, but its tissues still continue to live for several hours. During this time the activity of the living tissue consumes the soluble food material which is in contact with the cells and tissues, and thus continues to produce the waste substances, which during life are rapidly removed from the body through the kidneys, lungs, and other excretory organs. When the heart ceases to beat, this cleansing process ceases, and the poisons, which are ever forming at a rapid rate, accumulate until the vital tissues are so saturated that every living structure is killed. So the flesh of a dead animal contains nothing but venous blood and poisonous juices, in addition to

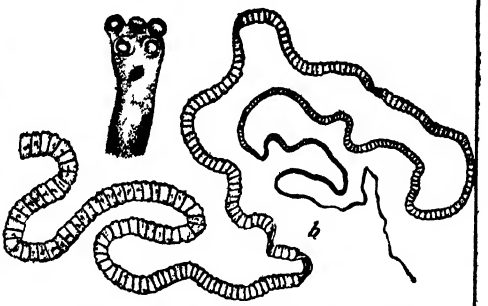
the organized tissues which have not yet been broken down.

Flesh Eating Tends to Degeneracy.— From these facts it is apparent that it is impossible for one animal to subsist upon another animal without increasing the amount of waste matters in its own tissues. As these wastes accumulate, the vitality and life of the animal must be smothered, just as the accumulation of ashes and smoke smothers the fire in a stove or furnace. It is thus apparent that the use of flesh must lead to the hastening of those degenerative processes which finally result in old age and death.

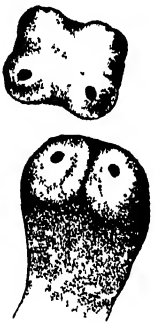
Flesh Eating and Disease.— Flesh eating not only weakens the power of the body to defend itself against disease, but actually communicates disease to the body. It will be well worth our while to consider a few of these. One of the most common is tapeworm, a parasitic disease which owes its existence in human bodies entirely to the practice of flesh eating.

The tapeworm does not inhabit the stomach, but the small intestine, in which the creature sometimes grows to enormous length. The parasite is made up of short sections, each of which is provided with means for holding to the walls of the mucous membrane. Each section of the worm is continually throwing off eggs, which, finding their way through sewers into streams, are swallowed by cattle and other domestic animals. In the bodies of some of these animals the young tapeworms develop active embryos, which work their way into the blood vessels, and are by this means distributed throughout the body. Reaching the muscles, they become established, and undergo further

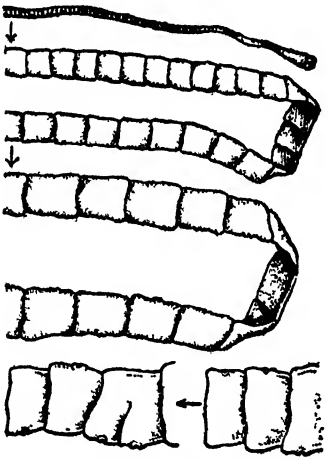
A Piece of Meat Infected with Pork-Measles.



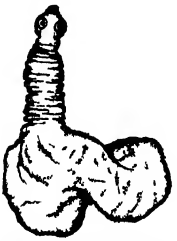
Pork Tapeworm, Head Highly Magnified.



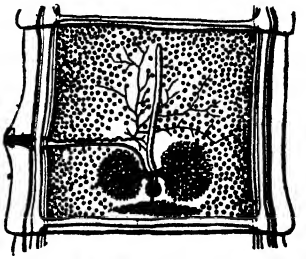
Head of Beef-Measle Tapeworm.



Several Portions of an Adult Beef-Measle Tapeworm.



Pork-Measle Bladder Worm.



Mature Segment of Beef-Measles Tapeworm.

development. Beef or pork which contains these cysts, or tapeworm embryos, is said to be "measly." When measly flesh is eaten, the cyst wall is digested off by the gastric juice, and the embryo is set free; passing into the intestine, it fastens itself to the mucous membrane, where it commences rapid growth, and produces all the distressing and inconvenient symptoms arising from the presence of the parasite in the alimentary canal.

As pointed out by Dr. Leidy, the famous Philadelphia anatomist, the tapeworm is, in the great majority of cases, derived from the use of raw or underdone beef. In only about one-tenth of the cases is the disease derived from pork.

It has been shown that fish may communicate tapeworm as well as the flesh of the ox. Most fish are carnivorous.

This is clearly evidenced by the nature of bait which is commonly used in catching fish. Who would think of going fishing with cherries, blueberries, or bits of apple, or potato as bait? From a physiological standpoint it would seem that one might as well eat a cat or a dog as a fish. Indeed, the fact is not to be disguised that not a few of those whose appetites have been trained on fish have acquired a taste for the flesh of dogs, the meat of which, as well as that of cats, has more than once been used to give to some popular brand of sausage its particular characteristic and much esteemed flavor.

The trichina is another bodily parasite with which man becomes infected through eating the flesh of animals.

The disease is almost universally contracted by the use of lean pork, most commonly in the form of ham and sausage, although within the last few years instances have been reported in which trichinæ have been found in fish and fowls. In its natural history the trichina somewhat resembles the tapeworm. In flesh infected with trichinæ, the parasites will be found inclosed in small cysts. The cyst walls are dissolved by the gastric juice when the flesh is eaten, and the parasite is thus set free. It soon develops numerous young parasites, and these quickly bore their way through into the blood vessels, in which they are swept along by the blood to the muscles. Here they lodge, becoming encysted in little capsules, where they may remain in a quiescent state for years, giving rise to no further inconvenience in some cases than rheumatic or neuralgic muscular pains. In severe cases, however, other symptoms arise, such as purging and vomiting, set up by the irritation of the millions of parasites boring their way through the intestinal walls. During the migration of the parasites through the body, the patient suffers from fever, severe muscular pains, perhaps cramps or spasms, and other symptoms resembling rheumatism, spinal meningitis, and other maladies.

Another form of malady derived from animals is tuberculosis.

According to a recent report by Dr. Salmon, tuberculosis is increasing at a remarkable rate in this country among cattle and swine. It is known that two or three out of every hundred cows are infected, and in some districts twenty-five and even fifty per cent of

the cows are suffering from this germ disease. Professor Koch has undertaken to show that such flesh is not dangerous; but very few scientists agree with him, and various experiments which have been made since his announcement of this idea have proved very conclusively that the disease is communicable to human beings. A nurse inoculated with the germs obtained from a cow infected with tuberculosis, has been taken to a hospital, suffering with consumption. Three men in Berlin who were inoculated with material obtained from a tuberculous cow, have also shown signs of the disease. A butcher inoculated his thumb while cutting the flesh of a tuberculous animal, and contracted the disease. Numerous similar instances have been brought forward.

It is hence clear that Professor Koch is mistaken, and that the flesh of tuberculous animals must be condemned as absolutely unfit for use as food. The weekly report of the officials in charge shows that many tons of such flesh are condemned every week in the Union Stock Yards in Chicago. Doubtless many times the quantity condemned, in which the disease is still in an incipient stage, escape the observation of the inspectors.

It has been clearly shown that typhoid fever is not infrequently contracted from oysters which are scavengers and live upon the slime and ooze of the ocean bottom. Typhoid fever germs are found even in the mouths of oysters, where, as has been shown by actual experiments, they are able to live for several weeks. Epidemics of typhoid fever in England and France

as well as in this country have not infrequently been traced to the use of oysters.

The hog is so universally diseased that the wisdom of the divine prohibition of the use of hog's flesh quoted in the Pentateuch is clearly apparent to every one who has given this subject attention. Hogs and other animals are subject to numerous other inflammatory and infectious diseases, which give rise to poisonous substances the presence of which in the tissues must render them entirely unfit for food, and subject to disease conditions which are none the less dangerous because so obscure that their real origin is in many cases never traced. To the presence of such poisons may doubtless be fairly attributed many of those sudden outbreaks of sickness which follow the use of canned meats and other meat preparations, such as that which recently occurred in a Western military barracks when eighty soldiers, strong, hearty men, were all made exceedingly sick, many barely escaping with their lives, immediately after partaking of a flesh meal. Who ever heard of such results following the use of bread, potatoes, or any other vegetable food, unless there had been accidental or intentional addition of poisons of some sort?

A German chemist pointed out years ago that decomposition, or decay, in animal substances is always accompanied by the production of deadly poisons. These are generally known as ptomains and toxins. There are many of them so subtile in character that a very minute quantity will produce poisonous effects. Certain savage tribes poison their arrows by striking the points into the bodies of decomposing animals.

It is to these poisons that are due so-called dissection wounds, which sometimes prove fatal to medical students and physicians. Butchers not infrequently suffer from wounds of the same nature, as the result of cutting themselves with knives that have been used in cutting meat.

The common practice of keeping flesh until it is tender is simply waiting for decomposition to advance to such a stage that the muscular tissues have lost their natural tenacity; in other words, until they are softened by the process of decay.

Canned meats are undoubtedly the most common of all sources of meat poisoning. It is perhaps not generally known that canned meats decompose with very great rapidity, and develop deadly poisons, often within a few hours after the can is opened, so that deadly effects may be produced by eating of the contents of a can opened and partially consumed at a previous meal. Numerous cases of this sort have been reported. The only certain safety from this source of disease and death is in the total disuse of flesh foods, especially since it is now well understood that in certain forms of decomposition that take place in flesh, non-odorous substances are formed that are most deadly poisons, so that neither smell nor taste can give warning of the existing danger.

Meat Eating and Uric Acid.— Drs. Haig and Hall, of England, have shown that all flesh foods contain uric acid in large amounts. A pound of beef contains fourteen grains of uric acid, a pound of liver, nineteen grains; a pound of sweetbreads, seventy grains. This explains the great prevalence of gout and rheumatism

among persons who make free use of flesh foods. Uric acid and other poisonous substances derived from the bodies of dead animals are productive of a great variety of maladies known as uric acid disorders, in addition to gout and rheumatism, which are well known to be due to this poison. It is not so generally known that neurasthenia, nervous prostration, many cases of neuralgia, nervous headache, calculus of the bladder, and premature hardening of the arteries are also attributable to the baneful effects of the poisons derived from flesh foods.

Verneuil, of Paris, and Roux, of Lausanne, have recently announced the startling theory that the use of pork is the cause of cancer. M. Verneuil some time ago stated that his observations had convinced him that the use of meat as a regular diet was the most probable cause of cancer, and the further study of the subject has led him to the conclusion that pork, if not the sole cause of cancer, is at least a very common factor in the etiology of this disease.

Haig has called attention to the fact that epileptic attacks are due to an increase of uric acid in the blood, whereby the circulation in the brain is interfered with. He, as well as others of equal experience, has found that the avoidance of flesh foods, together with tea, coffee, cocoa, and similar beverages containing poisonous elements similar to those found in meat, is one of the most effective means of controlling epilepsy.

Is Flesh Eating in a Strict Sense Ethical?—The lower animals are sentient creatures as well as man. Although accustomed to think of them as things along with sticks, stones, and trees, they are really beings;

their brains are like our brains, their muscles like our muscles, and their bones like our bones; they digest as we digest; they have hearts that beat as ours beat, and nerves that thrill as ours thrill; they possess to a wonderful degree the same capacities, the same appetites, and are subject to the same impulses as we. An ox, a sheep, can hear, see, feel, smell, taste, and even think, if not as well as man, at least to some degree after the same fashion. The lamb gamboling in the pastures enjoys life much the same as the little child chasing butterflies across the meadow. A horse or a cow can learn, remember, love, hate, mourn, rejoice, and suffer, as human beings do. Its sphere of life is certainly not so great as man's, but life is not the less real and not the less precious to it; and the fact that the quadruped has little is not a good and sufficient reason why the biped, who has much, should deprive his brother of the little that he hath. For the most part it must be said that the lower animals have adhered far more closely to the divine order established for them than has man. When animal eats vegetable, there is no pain, no sorrow, no sadness, no robbery, no deprivation of happiness. No eyes forever shut to the sunlight they were made to see, no ears closed to the sweet melodies they were made to hear, no simple delights denied to the beings that God made to enjoy life,— the same life that he gave to his human children.

To eat a thing that looks out of eyes is closely related to cannibalism. Eyes imply a mind, an intelligence, something that has feeling and capacity for enjoyment, and that looks out upon the world, forms

its opinions, its likes, its dislikes, enjoys, suffers, loves, *hates,*— experiences in which *all* creatures belonging to the animal kingdom are one. So there is, in a certain sense, not only a universal brotherhood of man, —although few recognize even this fact,— but there is likewise a greater brotherhood, which includes not only man, civilized man, savage man, Christian man, heathen man,— all men,— but likewise man's humble relatives of the animal world, into whose nostrils as well as into man's God breathed the breath of life.

The influence of the abattoir, of the common slaughter-house, is equally shown in the moral deterioration evident in the men whose lives are devoted to the slaughtering of innocent beasts. The ears of such men become deaf to the agonizing cry of the intelligent brute that suspects its fate. The spectacle of a living being pouring out its life-blood in a gushing stream, loses its ghastliness; the sight of quivering flesh, of writhing entrails, loses its gruesomeness; life, that divine spark of infinite energy which animates all living things, and makes all sentient creatures kin,— this wonderful, mysterious, God-given life,— loses its sacredness. The hired assassin is almost always a butcher. The perpetrators of many of the most atrocious and cold-blooded crimes have been more frequently butchers than men of any other occupation. That a man is by trade a destroyer of brutes—a butcher —is almost universally, in Christendom, regarded as a disqualification for service upon a jury in which the question of responsibility for human life is involved.

Red blood is a mark of kinship which as human beings we must recognize. The Bible declares the

unity of animal life. "The Lord God formed man of the dust of the ground, and breathed into his nostrils the breath of life." Gen. 2:7. "And they went in unto Noah into the ark, two and two of all flesh, wherein is the breath of life." Gen. 7:15. There is a fraternity more comprehensive and more universal than the "brotherhood of man." Let us think and speak of the "brotherhood of being." Let us see in the ox a patient, industrious kinsman, worthy of respect. Let us see and recognize in the sheep a meek and docile fellow creature appealing to us for protection and admiration.

When God placed man in the earth, he informed him respecting the food which was especially adapted to his constitution and needs, and for the digestion of which his digestive organs were especially fitted. "And God said, Behold, I have given you every herb bearing seed, which is upon the face of all the earth, and every tree, in the which is the fruit of a tree yielding seed; to you it shall be for meat. And to every beast of the earth, and to every fowl of the air, and to everything that creepeth upon the earth, wherein there is life, I have given every green herb for meat." Gen. 1:29, 30. Certainly no one could be better acquainted with man's needs than his Creator. The bill of fare given Adam has never been withdrawn, and must be as well adapted to Adam to-day as six thousand years ago.

When permission to eat flesh was granted, it was specially stipulated that the blood should not be eaten: "But flesh with the life thereof, which is the blood thereof, shall ye not eat." The command to abstain

from blood, that is, to remove it thoroughly before eating the flesh, is thus clearly shown, and applies to the whole human family since the flood, or to every person who has ever had permission to eat flesh.

According to Jewish writers, the old Jews carefully separated the blood from the flesh by covering the flesh with salt and afterward washing it thoroughly. The orthodox Jews do the same to this day.

A prominent Jewish rabbi, who was born and educated in Jerusalem, thoroughly familiar with the practices of orthodox Jews, recently demonstrated the method which was still used by strict observers of the ancient Jewish rites in the preparation of flesh for food. The flesh is first cut in slices, then tessellated, or deeply cut and hacked in all directions, then is buried in salt for an hour or an hour and a half, at the end of which time the juices of the flesh and the blood which it contains are pretty thoroughly extracted. This is carefully drained off. The flesh is then placed in water and washed until almost white, that is, until the blood has been thoroughly removed. The Jews understood and still understand the prohibition of the blood to apply to the blood in the flesh as well as that in the large arteries, so that great pains were taken not only to bleed the animal thoroughly, but to thoroughly remove from the flesh the blood remaining in it.

There is a wonderful divine mystery in the blood. It carries life into every part to which it flows. It is the vehicle through which the creating, maintaining, and healing power manifested in the body is carried on. God works in the blood in building, rebuilding, nourishing, and healing the bodies of both man and

animals. This fact must ever be kept before the mind. If man finds it necessary to eat the flesh of animals, he must recognize that he is taking life in so doing, and he must do it only under circumstances of dire necessity, when his own life will perish unless the life of an inferior creature is sacrificed in his behalf. The life of an animal must not be taken ruthlessly, but with reverence for the Creator and with respect for the rights of the animal.

That this prohibition of blood applies to Christians as well as to the Jews will be clearly evident from a study of Genesis 9; Acts 15:18–29. You will find it interesting also to read Adam Clarke's Commentary on these portions of Scripture.

The following table, prepared by Professor Hall, of Owens Medical College, Manchester, England, will be interesting to those who wish to eliminate uric acid from their dietary.

Table showing the amount of uric acid in common foods:

	Grains of Uric Acid per Pound
Fish (salmon)	8 15
Mutton	6 75
Veal	8 14
Pork	8 48
Sweetbread (thymus)	70 43
Beefsteak	14 45
Liver	19 26
Oatmeal	3 46
Peas (including the hulls)	2 54
Beans (including the hulls)	4 17
Potatoes	0 14
Asparagus	1 50
Wheat Bread (white)	0 00
Rice	0 00
Cabbage lettuce	0 00
Cauliflower	0 00
Eggs	0 00
	Grains of Uric Acid Per Pint
Lager Beer	**1 09**
Ale	**1 27**
Porter	**1 36**
Tea	**3 22**
Coffee	**4 53**
Milk	**0 00**

PRACTICAL HINTS ABOUT EATING

THE ART OF CHEWING

THE process of mouth digestion consists in the mastication, or chewing, of food, the secretion of saliva, and mingling of the same with the food, and the conversion of cooked starch into sugar (maltose). By mastication, the food is reduced to fine particles; the process is aided by admixture of saliva. The amount of saliva formed depends upon the character of the food. Dry and highly flavored foods cause the salivary glands to pour out an abundance of saliva, whereas liquid foods excite the activity of the salivary glands very slightly or not at all. To insure an abundant outflow of saliva, it is, then, highly important that food containing starch shall be eaten dry, and that it shall be thoroughly chewed, being retained in the mouth for a sufficient length of time to secure the secretion and the admixture of a sufficient amount of saliva to do the work required of this important digestive fluid. If the mastication continues long enough, some portion of the starch is converted

into sugar while it is still in the mouth. It is this which gives the sweet flavor to a bit of crust or a hard cracker which has been chewed for a long time.

Pawlow, of St. Petersburg, in experiments upon a dog, observed that when food was introduced into the animal's stomach through an opening made for the purpose, no digestive activity followed; the gastric juice was not poured out, and the stomach apparently remained inert. It is important that the food should be retained in the mouth for a sufficient length of time to make the proper impression upon the nerves of taste, so that the entire digestive apparatus shall be thoroughly prepared to carry the food substances through the successive steps of the digestive process. Food should remain in the mouth until reduced to a soft, pasty consistency that will mix readily with the gastric juice and other digestive fluids.

The stomach is not capable of grinding and reducing the food. If this work is not done in the mouth by the teeth, that portion of the food which enters the stomach in the form of coarse particles will remain there a much longer time than is necessary. The result will be irritation of the stomach, and an excessive secretion of the gastric juice of a highly acid character. The gastric juice does not remain in the stomach for an indefinite time. Absorption begins after the food has remained in the stomach three or four hours, or long enough for digestion to take place under favorable conditions. It is thus very clear that if the food is imperfectly chewed, some portion of it may be left in the stomach after the gastric juice has been partially or wholly absorbed; there is, consequently, no protec-

tion against germs which enter the stomach through the mouth. Fermentations and putrefactions readily take place. The undigested food stuffs furnish abundant material for the germs to feed upon, so that they multiply with great rapidity. If there are present in the food considerable quantities of sugar and partially digested starch, there will be a rapid growth of germs which feed upon these substances, and the result will be the formation of gases and acids in large amount. Sour stomach, heartburn, and colic are some of the maladies thus produced. If there is present in the undigested foods a considerable amount of albumin or proteids, as when meats are eaten, the growth of those germs which feed upon these substances will be encouraged. These germs are of a sort very dangerous and destructive. They do not give rise to fermentation, but cause putrefaction, the result of which is catarrh of the stomach, biliousness, jaundice, and various inflammations of the stomach and bowels. This condition encourages the development of typhoid fever, cholera, and other infections.

Fresh Fruits of Great Dietetic Value.—The abundant production of fruits in the summer months suggests the special value of this class of food during the warm season; but fruits are valuable at all seasons, not because of the large amount of nutritive material which they contain, for with a very few exceptions they consist chiefly of water, but because of their valuable nutritive properties, and especially the organic acids and peptogenic substances which they contain.

The Nutritive Value of Fruits

Green fruits are very much like vegetables, consisting chiefly of wood, water, starch, and tannic acid. During the process of ripening, or "cooking in the sun," as the Mexicans say,—"*Cocido en el sol,*"— the starch is converted into levulose, or fruit sugar, the sweetest of all the sugars, and vegetable acids,— citric, malic, or tartaric, according to the variety of the fruit. Thus, in ripe fruits there is no starch; fat is also absent, and the amount of albumin is so small as to be practically disregarded. Ripe fruit, then, practically consists of digested starch, or sugar, and fruit acids which require no digestion. It is, in other words, a digested food, the process of digestion having been completed by the magic influence of the sun's rays during the process of ripening.

The amount of acid in fruit varies. Some of the sweet fruits contain a considerable quantity of acid as well as those which are distinctly sour, the acid being simply covered by the considerable amount of sugar present. *Citric acid* is chiefly found in lemons, sour oranges, limes, shaddocks, grape fruit, and cranberries. *Malic acid* abounds in sour apples, pears, peaches, apricots, gooseberries, currants, also in cherries and other sour fruits. *Tartaric acid* gives to sour grapes their acid flavor. Some very sweet varieties of grapes contain almost no acid.

The Nutritive Value of Fruits.— The following table shows the nutritive value of the most common fruits, also the amount of acid contained in each of the most common fruits, and the percentage of sugar to one of acid:

	Water	Proteid	Pectose	Fruit Sugar	Fruit Acid	Salts	Total Nutrit'e	Total Food Units in oz
Whortleberry..	78.4	.8	.9	5.	1.6	1.	9.3	18,900
Blackberry.. .	86.4	.5	1.4	4.1	.2	.4	6.6	6,200
Raspberry.....	85.7	.4	.7	3.9	1.4	.5	6.9	5,800
Strawberry....	87 6	1.1	.5	6.3	.9	.8	10.1	8,100
Gooseberry.. .	85.7	.5	1.4	7.1	1.4 malic	.4	10.8	10,900
Cranberry.....	89.6	.1	....	1.5	2.3 citric	.2	4.1	2,800
Currant.....	84.7	.5	.9	6.4	2.2 malic	.7	10.7	9,200
Grape	78.2	.6	2.	14.3	.8 tartic	.5	18.2	18,800
Cherry	79.8	.7	1.8	10.2	.9 malic	.7	14.3	14,000
Peach.....	80.	.7	7.1	4.5	.9 malic	.7	13.9	13,700
Apple.....	84.8	.4	4.8	7.2	.8 malic	.5	13.7	13,900
Pear.....	83.2	.4	3.3	8.2	.2 malic	.3	12.4	13,600
Prune.....	81.2	.8	4.9	6.2	.8	.7	13.4	14,300
Plum.....	84.9	.4	4.6	3.6	1.5	.7	10.8	10,500
Apricot.....	81.2	.5	6.4	4.6	1.2 malic	.8	13.5	13,700
Orange..... ..	86.9	.8	....	4.5	2.5 citric	.5	8.3	8,127
Lemon....	89.2	1.0	....	8.3	7.5 citric	.5	11.3	9,695

The nutritive value of the organic acids is about two-fifths that of an equal weight of starch or sugar.

Some Common Errors about Fruits.—There are many popular but unfounded prejudices against the dietetic use of fruits. It is generally supposed, for example, that fruits are conducive to bowel disorders, and that they are especially prone to produce indigestion if taken at the last meal. The truth is the very opposite of these notions. An exclusive diet of fruit is one of the best-known remedies for chronic bowel disorders. During the late war, large numbers of soldiers suffering from chronic dysentery were in several instances rapidly cured when abundantly supplied with ripe peaches. Fruit juice may be advantageously used in both acute and chronic bowel disorders. Care must be taken, however, to avoid fruit juices which contain a large amount of cane sugar. Juices of sweet fruits should be employed, or a mixture of sour and sweet fruit juices, or acid fruit juice may be sweetened with malt honey or meltose, a natural sweet produced from cereals. Raisins, figs, prunes, sweet apples, and pears may be mixed with sour fruits.

Fruits Are Predigested Foods

Indigestion sometimes results from the use of fruits in combination with a variety of other food substances; but fruits taken alone constitute the best possible menu for the last meal of the day. The combination of fruit, sugar, cream, bread, butter, cake, and pie may well produce bad dreams and a bad taste in the mouth in the morning. The use of fresh or stewed fruit alone without any addition whatever will produce no disturbance, and will leave no unpleasant effects behind to be regretted in the morning. Very acid fruits sometimes disagree with persons who have an excess of acid and those who are suffering from chronic inflammation of the stomach; but with these exceptions, there are almost no cases in which fruit may not be advantageously used.

The notion that acid fruits must be avoided by rheumatics is another error which is based on inaccurate observations. The fact is, rheumatics are greatly benefited by the use of fruit. At the same time they should abstain from flesh foods of all sorts, beef tea and animal broths, and all meat preparations, also tea and coffee, as well as alcohol and tobacco. It is, of course, possible for one to take an excess of acids, as one may take an excess of starch or any other food substances. Vegetable acids differ from mineral acids in the fact that they do not accumulate in the body, but are assimilated or utilized in the same way as sugar and allied substances.

Fruits Are Predigested Foods. — Fruits have an advantage over all other foods in that they furnish to the animal, in a completely digested form, ready for immediate assimilation, such material as is needed to

re-enforce muscular energy. To this fact is due the refreshment which is so promptly experienced by fruit juices when one is tired, and to the craving for juicy fruits under such circumstances. Most juicy fruits furnish not only water, but a small amount of digested food substance in the form of sugar which is taken at once into the blood, and being carried to the muscles, replenishes the stores of energy which have been reduced by activity, and so brings refreshment and re-enforcement of vigor and strength.

Fruits also aid the digestion of other foods by promoting the formation of the gastric juice, and particularly the production of pepsin.

Fruit Juices Are Nature's Germicides. — Another advantage afforded by the use of fruits is the fact that fruit acids readily destroy nearly all germs. Typhoid fever germs, cholera germs, and other germs likely to produce acute disease are quickly killed by coming in contact with dilute solutions of citric and malic acids. Lemon or sour apple juice destroys germs almost instantly. The juice of lemon added to an ounce of water may be relied upon to render the water sterile within half an hour, even though it may contain the germs of typhoid fever and cholera. This precaution may be advantageously taken by travelers, though, of course, it would be better to avoid all risk by using only boiled water when traveling. The antiseptic properties of fruit render it exceedingly valuable as a means of cleansing the stomach and the alimentary canal. The germs which grow in the stomach are all quickly killed when in contact with the juice of fresh fruit. This explains the beneficial effect of the *grape cure,*

the apple cure, the peach cure, and various other fruit cures which have been for many years practiced in Switzerland and other portions of Europe, and have more recently been employed in California, Ohio, and other parts of this country.

Curative Virtues of Fruits and Fruit Juices. — The author has for a number of years made use of an exclusive fruit diet in the treatment of obesity, biliousness, and various forms of indigestion. In obesity an exclusive fruit diet for three or four days causes a rapid loss of flesh without any considerable amount of discomfort. Fruit fills the stomach, and stays the cravings for food, while furnishing very little nutritive material. Acid fruits are preferable to sweet fruits for this purpose. It is a good plan for a person who is too fat to make his diet consist largely of fruit, taking other food only at the midday meal. Persons suffering from chronic biliousness may pursue the same plan. Fruit is the best food for the last meal of the day, as before indicated.

In fevers, fruits, especially in the form of fruit juices or fruit soups, are a most convenient food, and certainly the most appropriate of all foods. It is almost universally recognized as an established fact that beef tea and meat preparations of all sorts should be wholly proscribed in cases of fever, as the patient is already suffering from the accumulation of waste matters to such a degree that the addition of even the smallest amount contained in beef tea or a small piece of meat may be sufficient to give rise to an exacerbation of the disease and to lessen the patient's chances of recovery.

German physicians make great use of preparations of fruit in fevers, particularly of *fruit soups*. In many parts of Germany, fruit soup is made by boiling for some time one part of dried fruit of some sort with four or five parts of water. In cases in which considerable gastrointestinal irritation exists, the soup or decoction thus prepared should be carefully strained, so as to entirely remove the skins and all other extraneous matter. A little cornstarch or rice flour may be added if desired.

Lemon juice, the juice of oranges, apples, cherries, grapes, raspberries, blackberries, and huckleberries, also the juice of tamarinds, currants, and cranberries may be added to water as a beverage in fevers. Thus used, they not only increase the quantity of water which the patient is able to drink, by giving to it a distinct and agreeable flavor, but also aid in the elimination of the poisons with which the system is struggling, by a slight diuretic action. Fruit juices used in the same way are likewise highly beneficial in Bright's disease and other forms of kidney disease in which it is desirable to increase and maintain the flow of urine. The grape fruit, the lime, the shaddock, and the pomegranate afford agreeable acid juices which may be used in the same manner. The antiseptic value of fruit juices must also be recognized as a positive benefit in these cases. The fever and most of the other symptoms present in typhoid fever are due to disease germs, which, growing in the alimentary canal, invade the blood and the tissues, and flood the body with virulent poisons, which work widespread and varied mischiefs. Beef tea, broths, and other meat preparations, eggs, and milk encourage

the growth of these germs, while fruit juices destroy them.

There is no single article of diet of such great value in the treatment of intestinal inactivity or constipation as fruits. For this purpose, fruits must be eaten freely; and as a rule, in cases of this sort, it is better that the fruit should be taken at the beginning of the meal or a little while before eating. It is most effective when taken by itself in this manner. Raw apples, steamed figs, peaches, apricots, when not too ripe, prunes, oranges, and tamarinds are of greatest value for this purpose.

The Fruit Diet.— Persons who employ a fruit diet for the relief of chronic symptoms, such as rheumatism, neurasthenia, sick headache, etc., should not expect to be cured by the use of fruit for a few days or a few weeks, but should adopt the free use of fruits as a regular practice. In cases of periodical sick headache, which are almost always connected with dilatation of the stomach, a patient may advantageously adopt, systematically, the plan of confining himself to a fruit diet for one or two days preceding the day of the expected attack. It may be sufficient to confine the diet to fruit for one of the two daily meals, as for breakfast. Persons who require a fruit diet are generally benefited by the adoption of the two-meal-a-day plan, taking nothing after three or four o'clock in the afternoon, so that the stomach can be as thoroughly prepared as possible for the reception of food the next day.

If anything is taken later, it should be only some juicy, ripe fruit, as strawberries, oranges, peaches, or some similar fruit, containing little solid substance.

Fruit juice alone is better. There are cases in which a diet consisting of fruits and nuts exclusively is of very great service. Almonds, pecans, filberts, or hazel nuts, hickory nuts, English walnuts, and chestnuts, are best for the purpose. Chestnuts must be cooked; other nuts may be eaten raw. They are more easily digested when crushed or ground to a paste. When thus prepared and mingled with fruits, the result is a very palatable, nutritious, and wholesome food.

There is no means by which a coated tongue may be so quickly relieved as by the exclusive use of fruit or fruit and bread. Fruit alone may be taken for a few days; or fruit only for breakfast, and bread with fruit and perhaps a moderate allowance of nuts at dinner. The more closely the diet is confined to fruit and bread, the more rapid progress will be made. The best form of bread is granose biscuit or graham zwieback or any form of water bread made from whole-wheat meal or graham flour.

When the exclusive fruit diet is followed, fruit may be taken four times a day. A considerable variety of fruit may be taken if desired. Care must be observed to masticate the fruit thoroughly, especially fruit having a firm flesh, as apples, pears, and cherries. Such fruits, swallowed without being reduced to a complete pulp by chewing, are likely to produce fermentation and disturbances of the stomach and bowels. Those whose teeth are defective, in eating apples, especially, should take care to reduce the fruit to a pulp by scraping with a knife, or should adopt some other means of doing the work the teeth are unable to do in preparing the food to enter the stomach. It should be

remembered that while a ripe apple digests in an hour or two, a green apple will not digest in any length of time, but must be treated as a foreign substance in the alimentary canal, and may create inflammation and other serious disturbances. Even the green apple, however, may be rendered digestible by thorough cooking.

We are often asked the question, "May fruit be given to young children or infants?" There can be no question that the juices of most fruits are well adapted to the digestive organs of young children. Fruits contain chiefly sugar and dextrin which are in a condition ready for immediate absorption. They furnish just the sort of material needed for building the plump little body which is characteristic of infancy, and padding up the tissues with a thick layer of fat for protection against cold, especially in winter.

The juices of fruits are highly valuable as a means of cleansing the stomach and alimentary canal. Disease-producing germs cannot grow in them to any extent. This is particularly true of the juices of raw fruits. Ripe fruits, such as strawberries, peaches, and even the scraped pulp of apples and pears, may be taken without injury by most infants a few months old. Cooked fruits, such as baked apples, prune purée, and other fruit pulps, may be used without injury free from cane sugar and not eaten with cow's milk.

Fruit should be taken at regular meal times, not between meals. It especially combines well with cereal foods. Very acid fruit juices should not be given to infants. The juice of sweet grapes, sweet apples, and

other sweet fruits may be used freely by infants as well as by adults.

About the only caution which need be given in relation to fruits is, that they do not form a good combination with coarse vegetables. This fact explains many cases of serious gastric disturbance. Thoroughly healthy persons do not always need to observe the rule to avoid the use of fruits and vegetables at the same meal, but invalids, and especially persons with dilated stomach or slow digestion, will generally be greatly benefited by observing this precaution.

Fruits may be eaten either during, before, or at the end of the meal. Many persons, however, will profit by adopting the rule to eat juicy fruits only at the end of the meal. The reason for this is that cereals and all starchy food stuffs require very thorough mastication, and abundant admixture with saliva, not only to moisten them, but also to transform the starch after the food has entered the stomach, thus assisting in reducing it to an assimilable form and preparing it for the action of the gastric juice. When watery and especially acid fruits are taken with such foods, the flow of saliva is diminished and the action of the small amount of saliva produced is prevented, and thus the salivary digestion of the food in the stomach which occupies the first thirty or forty minutes of the digestive work done in the stomach does not take place, and indigestion is likely to result. If one, however, is making a meal of fruits and nuts, or predigested cereals in the form of malt honey, granuto, malted nuts, and similar preparations, this rule need not be observed,

care only being taken to secure thorough mastication, as there is practically no starch to be digested.

Fruit should be taken fresh, and soon after it has reached maturity. Canned fruit is inferior to fresh fruit. The same is also true of dried fruit. Still, both dried and canned fruit are far better than none, and with proper preparation dried fruit may render very great service if thoroughly cooked. The good effects of fruit are spoiled by the use of large quantities of cane sugar.

Each fruit has its own special adaptations and limitations. A few points in relation to each of the principal fruits employed as foods may be found of practical interest.

The Choicest Fruits. — The banana is one of the most wholesome and nutritious of all fresh fruits. A pound of fresh bananas nearly equals a pound of beefsteak in nutritive value. It contains about five per cent of albuminous elements, the balance being chiefly carbonaceous, or fat producing. The nutritive value of the dried banana is about four times that of the fresh fruit. Banana flour is a most wholesome food. Stanley and his associates lived largely for two years upon banana flour, while exploring the wilds of Africa.

Bananas are very wholesome, but should be well ripened. The wilted, tough fruit often found in the market is very unwholesome. Green bananas, like other green fruits, are improved by cooking, as by baking, or otherwise.

The apple is perhaps the best of all fresh fruits that grow in temperate climates. Its nutritive value is about thirteen per cent, or one-seventh its weight. The

acid of sour apples is very wholesome as a germicide. Sweet apples are somewhat more digestible than sour. Apples are easily digestible when thoroughly ripened. Hard or unripe apples are indigestible unless baked or stewed. Fresh apple juice is a delicious and wholesome beverage, and decidedly laxative in character, hence excellent in constipation; also used in hypopepsia as a means of gastric disinfection.

The pear is a very excellent fruit, useful for the sugar which it contains, but of less value than the apple, as it is deficient in acid.

Peaches and apricots are most delicious and wholesome fruits in their season. When thoroughly ripe or properly cooked without cane sugar, they are among the most digestible of all fruits. When of inferior quality, they may contain a considerable amount of woody substance, which should be carefully rejected in eating, only the soft, smooth pulp being swallowed. This is specially important in persons suffering from hypopepsia, or slow digestion.

The cherry is an excellent fruit in the fresh state, but much less easily digestible than peaches, strawberries, grapes, ripe apples, or pears. This is on account of the firm flesh of this fruit. Properly cooked, the cherry is entirely wholesome and is easily digestible. The acid juice of the cherry is, like that of the apple, a very valuable disinfectant for the stomach and bowels.

The cherry, as well as other acid fruits, should be rendered palatable by sweetening with Malt Honey or the concentrated juice of sweet apples, raisins, or other sweet fruit.

Plums and prunes are very excellent fruits, and useful in the dietetic treatment of gastric disorders. This is especially true of the prune, which is quite laxative on account of the considerable amount of sugar which it contains. In the use of plums and prunes, however, the skins should be very carefully discarded. They often remain in the stomach for a long time, and are wholly indigestible.

The fig is one of the most useful of all fruits. The dried fig is highly nutritious, and is the principal food for both man and beast in certain parts of the world. The fresh fig is very easily digestible, and, as well as the dried fruit, is decidedly laxative. Dried figs are less easily digestible than the fresh fruit, and should be steamed or converted into purée. In the use of dried figs, very thorough mastication is necessary. This is true of all fruits.

The pineapple is a most excellent fruit, containing a valuable acid which is a disinfectant for the stomach, and also a digestive principle obtained in the solution of nitrogenous elements of food. Care should be taken that the fruit is thoroughly ripe. A great proportion of the pineapples sold are quite unfit to eat.

The strawberry is one of the best and most easily digestible of all fruits. Its acid is highly valuable as a germicide. As usually eaten, however, strawberries are quite likely to promote indigestion, in consequence of the large amount of cream and sugar associated with them. It is better to eat the berry in its natural state, or with the simple addition of Malt Honey, or the concentrated juice of some sweet fruit.

The Best Nuts.— Nuts are perhaps the choicest of all nature's food stuffs. They represent the most concentrated form of nutriment with which we are acquainted. They are the vegetable analogue of meats, and contain all the useful elements found in meats, and in larger proportion, while at the same time wholly free from the injurious properties of flesh. A pound of nuts, almonds for example, contains almost as much albumin as a pound and a half of beefsteak, besides two-thirds as much fat as a pound of butter.

Almonds are exceeded in nutritive value by no other food known, except one or two nuts, which have a slightly higher percentage of food elements. The most abundant element of the almond is its highly digestible fat, which constitutes fifty-three per cent of the total weight of the nut. The almond contains twenty-one per cent of a remarkable nitrogenous substance of a chemical composition resembling gluten, but differing from it in the fact that it is more readily soluble in the digestive fluids, and also in the possession of remarkable emulsifying power.

The hickory nut is a very wholesome and valuable nut, but the quantities produced are too small to make it of practical value as a general article of food.

The pecan, a variety of the hickory nut, which grows in the Southern States, is not surpassed in nutritive value or digestibility by any other nut. The large amount of fat, and the high proportion of nitrogenous elements which this nut contains render it invaluable as a food nut.

The walnut, of which there are several varieties, is especially desirable for its delicate flavor, which com-

bines well with that of bread and grains. Crushed fine, they make a highly nutritious foundation for the meat of sandwiches and for the flavoring of cooked vegetables and grains.

The filbert has a much higher usefulness than has yet been accorded it. It is closely allied to the hazel nut. The flavor is delicately sweet and the meat dry and fine-grained. It contains about half its weight of an easily digestible fat.

Strictly speaking, the peanut is not a nut at all, but a leguminous seed. Botanically, it is more nearly related to the pea or lentil. The composition of the peanut, however, differs very greatly from that of any leguminous or farinaceous seed. All legumes as well as cereals contain a large proportion of starch or carbohydrates; in wheat, rye, barley, oats, corn, and rice it varies from fifty-eight per cent in oatmeal to seventy-eight per cent in rice. Legumes — peas, beans, and lentils — contain from fifty per cent to sixty per cent of starch; while the peanut contains, as stated by some authorities, less than two per cent of starch. This element is replaced in the peanut by fat, which is present to the amount of over forty-six per cent, or nearly one-half its weight. The botanical name of the peanut is Arachis. It is sometimes called the "underground kidney bean." It is also called by various other names, as groundnut, earthnut, monkey nut, American nut, mandubi, goober, Manila nut. In the streets of Cairo this nut is peddled by the Arab boys in the raw state, under the name of the Soudan nut. Its use is known in many countries, France, Spain, Peru, Europe, America, Africa, India, China, Japan,

and the Malay Archipelago, and it is rapidly becoming one of the important articles of commerce. The Chinese peanut, which is smaller and more palatable than those grown in the United States, is considered in some parts of China one of the four essential things which every man must have as necessary to life.

The general prejudice against the use of nuts on account of their supposed indigestibility is due to two things: first, their use at improper times, between meals, or when a sufficiency of other food has already been taken; and second, their imperfect mastication. As commonly presented for use, they are dry and brittle, and hence easily escape mastication. When swallowed in small bits, they are practically indigestible. Experiments made by the German government show that even very small particles of nuts pass through the alimentary canal entirely unchanged. The mastication of the nut should be so thorough that it will be converted into a creamy pulp before it is swallowed. When chewed in this thorough manner, all nuts are easily digestible. The chestnut and the peanut must be cooked, because of the raw starch which they contain.

Chestnuts differ from nearly all other edible nuts, in the fact that they contain little fat and a very large percentage of starch. They may be boiled or roasted. A convenient plan is to begin the cooking by boiling and finish by roasting in the oven. Prepared in this way, they are not so dry as when roasted alone. American chestnuts are sweeter than the Italian, but on account of the larger size, the latter are generally preferred for food purposes. In Italy, the chestnut is

largely used as a substitute for wheat and other cereals. In some portions of the country, especially in Lombardy, this nut is made into a meal, which is formed into cakes, which serve as bread.

The cocoanut is more extensively used, perhaps, as a food than any other nut. In certain of the Pacific Islands, it constitutes almost an exclusive dietary. Cows, dogs, donkeys, chickens, in fact almost every living thing, even certain species of crabs, live on the cocoanut, ingeniously working a way to the meat through the one open eye of the nut. In the country where it grows, the cocoanut is very largely eaten in the half-ripe state. At this stage, the meat is jelly-like in consistency, and may be eaten with a spoon. It is very toothsome and nourishing. The meat of the ripe nut is very hard to digest, and can scarcely be masticated sufficiently to prepare it for entering the stomach.

Vegetables. —It is quite clear that vegetables might be wholly eliminated from the bill of fare for human beings without any serious loss. Still, for healthy persons, these esculents are sometimes valuable, as they afford an opportunity for an agreeable change in the bill of fare.

The starch of the potato is more easily digestible than that of cereals, as has been shown by numerous experiments conducted in the experimental laboratory of the American Medical Missionary College, as well as by eminent German authorities. The ordinary manner of cooking the potato, however, imperfectly prepares the starch for the action of the saliva, and at the same time facilitates its passage through the mouth into the stomach without the proper admixture of the

saliva necessary for its digestion. There is thus a double disadvantage, which is quite likely to lead to fermentation in the stomach and the formation of acids and gases, especially when the action of the saliva upon the starch is still further interfered with by acid fruits. This applies equally well to all other starchy vegetables. When the vegetables are reduced to a powder by drying and grinding, then made into biscuit with wheat flour or by other means, and baked until slightly brown, these farinaceous substances are found to be quite as easily digestible as cereals prepared in a similar way. The digestibility of potatoes may be greatly increased by cooking, cutting into slices, then placing in an oven until slightly browned. The admixture of fat of any sort should, however, be carefully avoided during the baking. Nut cream, or properly prepared nut dressing, or some other fat-containing material may be added as a dressing in serving. Potatoes must be ripe and mealy to be well digested.

Green peas are highly nutritious. Well-cooked, tender *asparagus* shoots and *cauliflower* seldom cause gastric disturbances. *Green corn* is more easily digested, when properly cooked, than is ripened corn. It is probable that primitive man made free use of cereals in the milk stage. At this stage of its development, the seed contains a large amount of dextrin and sugar. These elements have not yet been converted into the insoluble starch, and hence are more perfectly adapted to the human digestive organs. One of the purposes of cooking is to bring the starch back to the state of dextrin, thus increasing its solubility and digestibility.

The *cabbage* is less likely to create gastric disturbance when eaten raw than if cooked. The reason for this is that raw cabbage, the substance being still alive, ferments less rapidly than the cooked cabbage which is dead. The raw cabbage may remain in the stomach quite as long, and probably is even less digestible by the gastric juice than the cooked cabbage, yet its slowness to take on fermentation enables it finally to escape into the intestine before fermentative or putrefactive processes begin. The food value of cabbage is so small that it is hardly worth eating. The same remark may be made with still greater emphasis in relation to such grass-like foods as *celery, spinach,* and *"greens"* of all sorts. *Onions* have quite a high nutritive value, but are spoiled by the presence of an extremely acrid and irritating volatile oil. At best, the onion can be tolerated only in minute quantities as a flavoring substance. A well-bred, hygienic palate will be quite willing to dispense with this noisome-smelling vegetable. *Mushrooms,* though belonging to the vegetable kingdom, must be regarded as unfit for human food. They do not manufacture food elements as do proper food-making plants, but are parasites which subsist upon the decomposing remains of other forms of life, and eke out a miserable, scavenger existence on this second-hand diet. The meaty or flesh-like odor of the cooked mushroom should arouse suspicion, and brand it as a second-hand source of nutriment, like the swine and other scavengers.

The tomato, while botanically a fruit, is generally associated with vegetables. Its acid flavor allies it with fruits, while its coarse structure gives it decided

affiliations with vegetables. It is unquestionably a good food, though somewhat more likely to disagree with sensitive stomachs than the more refined fruits which grow on trees and shrubs. Raw tomatoes must, on the whole, be regarded, from a dietetic standpoint, as an acid vegetable.

Milk and Milk Products.—Milk is commonly regarded as one of the most wholesome and easily digested of all foods, but this is true only in a modified sense. The members of each class of warm-blooded animals provide food for their young exactly adapted to their needs. Cow's milk is adapted to the stomach of the calf and its nutritive requirements. The calf's stomach is a very complicated apparatus, being, in fact, a group of four stomachs, rather than a single organ. It is intended to digest coarse and bulky materials, such as grass, twigs, and leaves. Cow's milk adapts itself to such a stomach, forming large, tough curds, which are easily enough digested by the calf, but which in a human stomach often become the source of great mischief, as the simple stomach of human beings, old and young, is adapted to the digestion of substances which are more easily dissolved. The natural food of the human infant accordingly forms small, soft curds, which are quickly dissolved in the digestive fluids. The milk of goats is more difficult to digest than that of the cow. Thousands of infants die annually because of indigestion set up by the use of cow's milk, and thousands of human beings, probably nearly half of all adults, are more or less injured by the use of cow's milk, which produces biliousness, sick headache, coated tongue, inactive bowels, and a variety of

other disturbances. These are not all due to the toughness of the curds formed in the stomach, but are partly the result of the great numbers of germs which are always found in milk, and which grow and set up fermentation and putrefaction in the stomach, unless the milk is thoroughly cooked before eating.

Many persons have noted that the eating of milk gives rise to acidity or flatulence, or both conditions. This is due to the fact, lately pointed out by an eminent European observer, that lactose, the sugar of milk, while easily digested by infants, is not well digested by adults, because the latter do not possess the proper digestive ferment, and hence ferments.

The conditions under which milk is produced renders it especially liable to contamination with germs. It is to these germs that cholera infantum is due, also most of the intestinal disorders from which young infants suffer at all seasons of the year, and especially in the summer. The United States Department of Agriculture, in its Bulletin No. 25, gives the following description of the sediment that is found in milk: "This dirt is largely composed of manure, but the microscope has also revealed undigested hay, molds, hair, shavings, woolen threads, linen threads, earth, cobwebs, particles of skin, human hair, pieces of insects, and down from birds."

The number of germs found in milk varies in different localities. In Boston an examination made some time ago showed the average number of germs to the drop to be 160,000. Other observers have found as high as sixty millions to the drop. Competent authorities declare that in European cities the number of germs

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found in milk is rarely less than 150,000,000 to the ounce, and sometimes reaching the enormous number of 5,400,000,000 to the single ounce. These germs are not all capable of producing definite disease like typhoid fever, or other recognized maladies; but they give rise to putrefactions by which poisons are formed, and the absorption of these gives rise to headache, lassitude, and a variety of unpleasant symptoms, besides setting up fermentations of other food substances with which the milk is eaten, thereby lessening their value, and giving rise to chronic indigestion in various forms.

Typhoid fever, diphtheria, cholera, tuberculosis, and other diseases are easily transmitted from animals to human beings through the medium of milk. Dr. Salmon, who stands at the head of the Bureau of Animal Industry of the United States Department of Agriculture, in a paper before the American Medical Association (1891), stated that two or three in every hundred cows in the United States are suffering from tuberculosis, and at least one in every hundred is so affected as to contaminate the milk with tubercle germs. These germs are especially liable to affect young children, giving rise to tuberculosis of the bowels, and to other forms of tuberculosis to which children are especially subject. In some European countries half of all the cows are affected with this dreadful disease, and in some parts of the United States the proportion is nearly as large. Tuberculosis is rapidly increasing among cattle, and the time is probably not far distant when a large proportion of cows in all civilized communities will be infected with this disease.

Milk and its products are unquestionably the most filthy articles which come upon our tables. Milk generally contains the dung of animals in such quantities that straining is necessary before it can be even tolerated, and after ordinary straining the last drops from the pitcher are always found to contain a very disgusting quantity of stable cleanings.

Cow's Milk Not an Essential Food.—While it may be impossible at the present time to dispense with milk altogether as an article of food, its use is certainly questionable, and it must be regarded as inferior to the natural products of the earth, and so likely to produce disease that its use should be as limited as possible; when it is clearly productive of evil effects, as in those who suffer from headache, coated tongue, constipation, or chronic biliousness. its use should be discarded altogether.

Cream in moderate amount, if well sterilized by boiling, is less likely to produce evil effects than milk. For sterilizing milk or cream it is necessary that it should be heated for fifteen or twenty minutes at a temperature sufficient to produce a slight scum upon the surface. This will destroy typhoid fever germs and the germs of tuberculosis, but it will not destroy the manure germs, which are the cause of bowel troubles, especially in young infants, and are probably the principal cause of biliousness. These germs are not destroyed even by ordinary boiling. To completely destroy them, milk must be boiled for half an hour three days in succession. After sterilizing, milk should be cooled as quickly as possible.

the wonderful provisions Providence has made for the disposal of decomposing matter.

How strange that man should have so debased his instincts and perverted his appetite that he can consider a morsel of rotting milk filled with scavenger creatures so great a delicacy that he is willing to swallow it, scavengers and all! It is indeed pleasant to turn away from these germ-infected foods derived from the animal kingdom, and feast our eyes upon the pure germ-free products of the trees and shrubs and the waving fields of grain, and know that in receiving these bounties straight from Heaven's hand, we are taking into our bodies those substances which are in the highest degree calculated to replenish strength, vigor, and tissue waste, without incurring the risk of injury or contamination of any sort.

Many savage tribes obtain milk supplies from vegetable sources. The milk of the cocoanut furnishes a satisfactory substitute for cow's milk to the teeming millions of many tropical countries; while the cow-tree of South America provides a vegetable milk so rich in fatty matter that it might be more properly called "vegetable cream."

All nuts contain fats in a state of emulsion; they also contain a large percentage of proteid matters. By crushing and mixing with water, a solution closely resembling milk may be made from most kinds of nuts. The amount of fat and proteid substances contained in such a solution does not differ very greatly from the proportions in which they are found in milk. Such a preparation made from almonds contains all the elements of nutrition, and in proportions better

adapted to the wants of human beings than does cow's milk. The fat which it contains is present in a state of perfectly natural emulsion. The proteid or albuminoid substances, corresponding to the albumin and casein of milk, are practically identical with the casein of mother's milk, and form in the presence of an acid, extremely fine and soft curds, which break up with the greatest readiness. In this respect, it is even superior to the natural food of the human infant.

Almond milk has a delicate flavor, with a suggestion of its nutty origin, but resembling cow's milk very closely. It agrees with the most delicate stomachs, and can be taken with perfect impunity by persons who cannot take cow's milk or cream, even in the smallest quantities, without suffering more or less severely in consequence. Added to cow's milk, nut cream prevents the formation of hard curds.

For most adults, and even infants, milk or cream made from crushed nuts is a good substitute for cow's milk.

Eggs.—The use of eggs is perfectly legitimate from an ethical standpoint. A large proportion of the eggs produced are sterile, and will only rot if they are not eaten. Careful examination has shown that eggs ordinarily contain no germs, uric acid, or any other injurious substance. Their composition is almost exactly the same as that of nuts, except that they contain a much larger proportion of water.

The average egg contains one ounce of white, one-half ounce of yolk. Ten eggs equal a pound of meat in nutritive value. The white of egg is six-sevenths water one-seventh albumin. The yolk of egg is one-

sixth proteid or albumin, one-third fat, and one-half water. Eggs contain a large amount of lime and iron. Nine eggs furnish the amount of proteids required for one day, and also the required fat. Nine eggs and twelve ounces of zwieback or twenty ounces of bread furnish a day's ration for an adult.

It must be remembered that eggs are extremely liable to deterioration. A fresh egg is simply a live animal in embryo. It is easily affected by extremes of heat or cold. A dead egg very quickly undergoes decomposition as does a dead animal. Stale eggs are as poisonous and as unfit for food as animal flesh which has begun to decay. The difficulty of obtaining eggs which are perfectly fresh, and the practical impossibility of knowing in advance that an egg is altogether wholesome, place this class of food under suspicion.

Hard-boiled eggs are very quickly digested if finely divided by thorough chewing with zwieback, toasted wheat flakes, or other dry foods.

Raw eggs remain longest in the stomach if swallowed without beating.

Water Drinking.—In general, it is best to take water at about the ordinary temperature—70° F. The practice of drinking large quantities of hot water before meals, or at any other time, is not to be commended, except in cases of chronic gastritis or catarrh of the stomach. In these cases, free water drinking serves a useful purpose in cleansing the stomach from accumulated mucus.

Half a glassful of hot water may be advantageously taken half an hour before each meal in cases of hyperpepsia, and the same quantity of cold water may be

taken with equal benefit half an hour before eating, in cases of hypopepsia.

In cases of fever, a half glassful to a glassful of water should be taken every hour regularly.

Water should be given freely to infants and children, who are often neglected in this regard. The quantity should be small, and should be given often. Even nursing infants need attention in this respect.

Persons who have a tendency to rheumatism should drink two or three pints of water daily, even though they feel no thirst.

Water may be rendered more acceptable by the addition of fruit juice of some sort. Cane sugar should be avoided.

Fruit juices and the juice of melons may be freely used to great advantage, especially in the summer season; but in eating melons, the pulp should always be rejected. It is quite indigestible, and likely to give rise to sour stomach and other disorders. Overripe melons are exceedingly unwholesome. There is perhaps some foundation for the popular belief that the free use of melons late in the season may encourage the development of malarial fever, or a febrile disorder resembling malarial disease.

Soft water is preferable to hard water. Distilled water is best of all, when it has been properly aerated. But good spring or deep well water, if free from contamination, is perfectly wholesome, even though a little hard. No injurious effects are likely to follow the use of water containing not more than twenty or thirty grains to the gallon of lime salts. Very hard water is injurious.

The greatest care should be taken to secure absolutely clean water; that is, water which is not contaminated with germs, animal organisms, or the excreta of animals. Distilled water is certain to be pure. Water which has been freshly boiled for fifteen or twenty minutes is safe. *Filtered water cannot be relied upon,* as the filter easily becomes contaminated, and if not thoroughly cleansed, may increase the contamination of the water passing through. Dug wells or shallow wells are unsafe sources for drinking water. Water from surface wells is always dangerous, because of the great facility with which drainage from cesspools, vaults, barnyards, and filth deposited upon the surface, even several rods distant, may find its way into the well by percolation through the soil. The author is acquainted with a case in which a whole family were made very sick by the use of water from a well which was contaminated with barnyard filth deposited in a hole on the opposite side of the road, fully sixteen rods away.

City water supplies sometimes become contaminated with dangerous germs, exposing hundreds, even thousands of people to infection. The water supply of a town in Pennsylvania some years ago became contaminated with typhoid fever germs washed down from a mountain side by a spring thaw. Nearly half the population were sick, and scores died in consequence.

Deep-bored wells, so-called artesian wells, are perhaps the safest sources of natural water supply. The well should be cased, and should penetrate one or more dense layers of rock, so as to reach what is sometimes

called the second water, to insure against contamination from the surface.

Typhoid fever, cholera, malaria fever, and many bowel disorders are due to the use of contaminated water, and hence are unnecessary afflictions, as they may be prevented by proper precautions. City water supplies are seldom clean enough for use without sterilization by boiling. It is useful to remember that water may be sterilized by means of acid fruit juice. The juice of a small lemon will in half an hour destroy any disease germs which may be present in a glassful of water.

Ice as well as water may be a source of contamination, as ice is often gathered from ponds and rivers which are polluted with sewage. Such water is certain to contain germs, which, not being injured by freezing, become active as soon as the ice is melted.

Carbonated water or water containing the juice of acid fruits is more readily absorbed than plain water. In preparing beverages from fruit juices, however, concentrated mixtures should be avoided, and also the free use of cane sugar, which is likely to increase the thirst, besides injuring the stomach and overtaxing the liver when taken in considerable quantities.

Objection to the Use of Clear Fats.—Grease, whether in the form of lard, tallow, butter, cotton-seed oil, olive oil, or other clear separated fats, is not a wholesome food, for the reason that it cannot be mixed with the food without impairing its digestibility and thus lessening its value. Nature provides fats in a state of emulsion, that is, in a condition of division into minute particles, which, when taken into

the stomach, mingle readily with the digestive fluids and other food elements without interfering with the digestive process, and when passed on into the small intestines are quickly absorbed into the circulation, and utilized. It is in this form that fats are found in nuts, nut butter, and other nut preparations, and in cream and milk. In the form of butter, lard, tallow, and others fats, the minute particles have been made to adhere in a homogeneous mass. When these fats are taken into the stomach, they merely float upon the digesting mass, smear the walls of the stomach, surround the particles, and to a considerable degree interfere with the process of gastric digestion, since the gastric juice has no effect whatever on fat. These substances cannot undergo digestion until passed on into the small intestines, where they are brought in contact with the pancreatic juice and the bile; but being detained in the stomach, and interfering with the digestion of other food substances, they promote fermentation and indigestion, giving rise to heartburn, biliousness, and other disorders.

Recent observations show also that the presence of fatty substances in the stomach in considerable amounts prevents the secretion of the acid needed for the proper action of the gastric juice upon the albumins of the food. Fats are necessary, but they should be taken in a state of emulsion, that is, in a creamy state.

This prevents interference with digestion; but when fat in the form of oil, lard, butter, etc., is added to the food, it smears over the particles of proteid, gluten, albumin, etc., so that the gastric juice cannot get

access to them to digest them. The gastric juice cannot act upon fats.

In the same way, fat interferes with the digestion of starch, saturating the particles of starch so that the saliva cannot act upon them to convert them into sugar. This is the principal reason why, in many cases, fats and fat foods are so apt to produce fermentation, sour stomach, heartburn, and other symptoms of indigestion.

We are often asked the question, "Are nut oils, olive oil, cottonseed oil, and similar fats derived from vegetable sources to be considered altogether wholesome?" To this question we must say no. The chief objection to the use of oil, lard, tallow, butter, and other forms of "grease" is that they present the fat in an artificially concentrated form, in which it does not harmonize with the other elements of food while undergoing digestion in the stomach.

It may be mentioned, also, that many of the nut oils and butters are made from unwholesome materials. Some cocoanut preparations, for example, are made from rancid cocoanut oils by a chemical process. Such preparations cannot be commended.

In nature, the fat is separated or held apart in minute particles, or drops, and these are arranged within the proteid masses in such a way that they cannot be set free until after the proteid, or albumin, is digested.

Pure fats are very disturbing to the stomach in some forms of gastric disorder, especially in gastric catarrh and dilatation of the stomach. The cooking of fats in connection with cereals and albumins greatly

aggravates the difficulty, for the reason that the fluid fat penetrates the starch granules, thereby rendering their digestion impossible, even after coming in contact with the digestive fluids. This is the reason why fried foods, griddle cakes, doughnuts, pastry, roasted peanuts, and even nut butter made from roasted peanuts, disagree with so many persons.

Natural fats are in a state of emulsion, as in cream. An emulsion may be diluted with water to an unlimited extent, as the oil is in minute particles, which are prevented from uniting by the thin film which surrounds each globule. Cream can be taken by many persons with whom butter disagrees, but with persons whose stomachs are dilated, cream and milk often produce effects which in their intensity are almost equivalent to those of an active poison, producing biliousness, sick headache, and other distressing symptoms.

In nuts, fats are presented in an emulsified state. Cream and milk made from nuts are entirely wholesome, and agree with persons who cannot take cow's milk and cream without very harmful results, on account of inability to digest casein.

The ripe olive is another wholesome source of fat which is worth considering. The olives must be thoroughly ripe, and before eating should be soaked long enough to extract the salt which they contain.

There are now supplied ready for use a variety of nut fats which are exceedingly wholesome and palatable, and are perfect substitutes for all kinds of animal fats and oils. Nut butter made from peanuts which have been cooked but not roasted, almond but-

ter, cocoanut cream, nuttolene, nut meals, and various other nut foods, are good sources of fat.

Objection to the Use of Cane Sugar.—Cane sugar, while properly classed as a food, and digestible in the small intestine, is nevertheless hardly to be considered a natural food substance, for it is never found in nature in the condition in which it appears upon our tables. The acid of fruits is not neutralized by the addition of cane sugar. The use of cane sugar with acid fruits is objectionable. It is better to combine acid with sweet fruits, or, if necessary, to avoid acid fruits. Dried fruits, such as figs, are rendered very digestible by steaming. Cane sugar is not digested in the stomach; it gives rise to fermentation and acidity, and is often a source of irritation. Its use is unnecessary, as starch, which constitutes a large per cent of all foods of vegetable origin, is wholly converted into sugar by the process of digestion. Brandel, an eminent German chemist, observed, in his experiments upon a dog, that a solution of cane sugar having a strength of less than six per cent, caused irritation, with reddening of the mucous membrane. A ten-per-cent solution produced a dark red color with great irritation; and a twenty-per-cent solution gave rise to still greater irritation, and produced such distress that the experiment was terminated. The author has met many cases of grave stomach disorder in which evidently the chief cause was the free use of sugar, either in the form of candy, or in connection with the use of coffee, oatmeal mush, or other so-called "breakfast foods." According to these observations, three ounces of sugar taken in connection with a full meal would

produce a solution in the stomach of sufficient strength to give rise to a decided gastric irritation.

Ogata, in experimenting upon dogs for the purpose of determining the effects of cane sugar upon digestion, observed that the addition of one-third of an ounce of cane sugar to a meal of meat reduced digestion one-fourth.

Cane sugar is derived from roots and grasses and other coarse vegetable growths. One of the four stomachs of the cow digests cane sugar readily, but cane sugar is not digestible in the human stomach, and hence is not adapted to human nutrition.

The sugars to which the stomach is naturally adapted are, milk sugar, or the sugar which is normally found in milk; malt sugar, which is produced by the action of the saliva upon the starch; and fruit sugar, or levulose, the sweet element of fruits, also found in honey. Fruit sugar in the form of sweet fruits,—as raisins, figs, prunes,—and malt sugar, which may be produced artificially by digesting starch with diastase (malt honey or meltose), should be used in place of cane sugar.

In the process of digestion, starch is converted into fruit sugar, passing through some thirty different stages. Ordinary cooking or boiling starch converts it into paste; this renders its digestion in the stomach possible, if it is retained there for a sufficient length of time. The saliva cannot act upon raw starch. A more prolonged cooking at a higher temperature produces a higher form of dextrin, which is soluble, and which is more easily acted upon by the saliva. Cooking at a temperature of about 300° F. produces achro-

odextrin, which is rapidly converted into malt sugar when brought in contact with the saliva.

Recent experiments show that maltose is much more easily digested and utilized by adult persons than are cane and milk sugar, and hence is much more wholesome and less likely to cause fermentation. Fruit sugar is still more easily assimilated, inasmuch as it requires no digestive change. Lactose or milk sugar is very easily assimilated by young infants, but experiments have shown that the digestion and appropriation of milk sugar rapidly diminishes after the age of two years, being four times greater in an infant than in an adult. Cane sugar is the least digestible of all sugars, and is the least easily appropriated by the system. This fact is shown by the prompt appearance of cane sugar in the urine when it is freely eaten in the form of syrup, confectionery, or otherwise. A liberal use of sugar thus becomes the cause of diabetes, a rapidly increasing malady.

The free use of cane sugar at the table and in cooking, in the form of preserves, syrups, and molasses, and sweet beverages, is unquestionably a most prolific source of injury to the stomach. It is no longer difficult to dispense with this toothsome, but mischief-making substance, since most excellent and wholesome substitutes are provided at a price which renders them accessible to all who are not able to supply themselves with an abundance of sweet fruits, especially raisins and figs. Dates are not altogether to be commended, for the reason that they are prepared by soaking in molasses or by a liberal addition of cheap sugar. This is not true of the finest variety of Tunis dates, but is practically universally true of Turkish and Egyptian

dates, the common date of commerce, which are in their native state very dry and quite unpalatable. The natives prepare them by stewing, as apples and other dry fruits are prepared in this country.

Sorghum, maple sugar, and maple syrup are essentially the same as cane sugar and molasses, the sweet element being the same under another name. The sugar of honey is less likely to produce indigestion than cane sugar, but because of the admixture of various foreign substances which are gathered by the bees in the collection of sweets from many different sources, honey disagrees with many persons when freely used.

The glucose of commerce is manufactured from the starch of corn and other substances by boiling it with sulphuric acid. This form of sugar is quite unlike the sugar formed by the digestive processes. There is no doubt that the large use of glucose, or grape sugar, in the form of candy, syrups, adulterated honey, and various other sweets which are in common use, is responsible for a very large number of cases of diabetes, a disease which is rapidly increasing.

How Much to Eat. — The amount of food required depends upon how the individual is employed, or the amount of work he does, and the temperature of the air to which he is exposed. A large person naturally needs more food than a small one, although the proportion is not a direct one; that is, a person who weighs two hundred pounds does not require twice as much food as one who weighs one hundred pounds. The requirements of the person of the lesser weight are about two-thirds as much as the amount demanded by the larger. The proportionately larger amount of food required by the smaller person is chiefly due to the

fact that the skin surface of the person of smaller weight is larger in proportion to the size than that of the larger person. A woman requires four-fifths as much food as a man; a child of ten to thirteen, six-tenths; a child of one to nine years of age, one-third.

Exposure to cold and active labor create a demand for a larger amount of food. A sedentary person consumes about nine-tenths of the food he eats in heat, one-tenth in work. A person engaged in active muscular labor consumes about one-fourth of his food in work, three-fourths in heat. This difference represented in food, amounts to two ounces of fat, or four of starch. Hence, if the sedentary man eats as much as the laboring man, he will not burn up all his food; the excess accumulates in the form of fat, or reserve tissue, and he will gain in flesh.

Another person of the same weight, engaged in active work out of doors, will utilize at least one-fourth of the total food consumed in work, the other three-fourths serving to maintain heat, a total of about ten thousand five hundred heat units. This difference of two thousand heat units would represent, in food, about two ounces of fat or four ounces of starch. If the sedentary person eats as much as the man who works out of doors, this four ounces of starch consumed will be stored up in his body in the form of fat or so-called residual or reserve tissue, so he will gain in flesh. After a time he will become overburdened with surplus material; in other words, obese. On the other hand, if the man working out of doors eats only the amount required by a sedentary life indoors, he will be obliged to consume a portion of his

own body in order to maintain his body temperature, and will be certain to lose several ounces in weight each day so long as the food supply remains deficient.

The normal daily ration, as determined by experiments by the author and others, consists of sixteen ounces of starch, three ounces of albumin, and one and one-half ounces of fat. These figures represent water-free substances; that is, the food stuffs are calculated as being perfectly dry. The actual weight and bulk will, of course, vary with the amount of water added in its preparation for the table, the average being three to four times the amount named for dry food, or four to five pounds of ordinary food, including fruits and such liquid foods as milk and soups.

The experience of Cornaro, the Italian, who lived on twelve ounces of solid food a day for many years and enjoyed remarkable strength at a very advanced age, and especially the remarkable experiments of Mr. Horace Fletcher, show that the above figures, which represent the amount of food actually eaten, rather than the amount really needed, are much too high. Mr. Fletcher has demonstrated that the amount really required is not more than two-thirds the above quantities. He has shown that a great part of the food is wasted by such imperfect mastication that the digestive organs cannot extract the nutritious parts. By chewing the food four or five times the ordinary time, the digestive juices are able to dissolve the useful parts, and thus none is wasted. This is a most important and useful discovery from an economical point of view, and is perhaps the greatest that has been made in a century or more, from a health standpoint. Thorough

chewing cures most digestive disorders, and prevents nearly all. Indigestion lies at the foundation of nearly all maladies, acute and chronic. It is the means by which the forces of the system are depreciated, the vital resistance lowered, and thus opens the door to disease-producing causes of all sorts. Thorough chewing insures health and prolongs life.

Food Values.—The accompanying table gives approximately the amount of different elements and the number of food units found in various substances as served at the table when prepared in accordance with recognized hygienic recipes.

	WEIGHT OZ.	MEASURE	PER CENT OF			Calories in 1 Oz.
			PROTEIDS	FATS	CARBO.	
Bananas	2.	1 peeled	1.4	1.4	29.8	39
Oranges	2.	1 peeled	1.31	.....	11.	14
Lemons	2.5	1 peeled	1.	.9	8.3	14
Prunes, stewed	9.2	.5 pt.	.5	.....	14.7	17
Raisins, stewed	9.2	.5 pt.	1.8	1.9	23.6	34
Peaches, canned	9.2	.5 pt.	.7	.....	12.5	15
Fruit-juice	8.8	.5 pt.	.7	.74	9.2	13
Apples, fresh	13.	2 large or 4 small	.4	.....	13.	14
Grapes, fresh	5.	1 av. bunch	.6	.....	16.3	19
Peaches, fresh	3.	1 peeled and pitted	.7	.....	12.5	15
Apricot, canned	9.5	.5 pt.	.5	.....	11.	13
Grape pulp	.....	.....	2.	.2	21.	32
Blackberry, canned	9.2	.5 pt.	.5	.....	5.5	7
Cherry, canned	9.2	.5 pt.	.7	.....	12.	15
Pear, canned	9.2	.5 pt.	.4	.....	11.5	14
Melon	.....	.....	1.	.3	2.2	5
Plum	.....	.....	.4	.....	8.2	10
Fig	.....	.....	4.	.....	49.8	62
Tomato	8.	1 medium	1.6	.3	2.5	5
Apple, baked	5.5	1 large	.18	.24	9.4	12
Rice, steamed	5.75	.5 pt.	3.	.16	31.4	40
Wheatose	7.	.5 pt.	5.7	.8	29.5	44
Macaroni	6.5	.5 pt.	10.	2.	75.	104
Granose	2.75	4	15.4	2.3	79.1	117
Zwieback	2.2	2 pieces	13.6	2.	70.	104
W. W. Wafers	2.5	6	9.8	13.6	70.	128
Rolls	4.	6	11.7	1.2	80.	110
Graham bread	1.	1 piece	9.5	1.4	53.3	77
W. W. bread	1.	1 piece	9.8	1.4	50.7	75
White bread	1.	1 piece	8.8	1.7	56.3	81
Nut-gravy toast	6.	1 piece	6.8	1.	35.	52
Tomato, stewed	8.	.5 pt.	.8	.15	1.25	3
Potato, baked	4.	1 medium	3.2	.15	27.5	36
Soup	8.5	.5 pt.	.8	.2	1.	3
Sugar	7.	.5 pt.	.....	.....	97.8	111
Beans, boiled	7.5	.5 pt.	12.6	22.8	1.4	74
Cream	8.5	.5 pt.	2.7	26.7	2.8	75
Milk	8.5	.5 pt.	3.6	4.	4.7	21
Egg	1.5	1	14.	10.5	.....	47
Ster. butter	7.75	.5 pt.	1.	85.	.....	218
Cottage cheese	7.6	.5 pt.	3.6	3.7	6.	20
Malted Nuts	5.75	.5 pt.	23.	20.4	49.3	140
Almond cream	8.25	.5 pt.	2.7	26.7	2.8	75
Nut butter	8.75	.5 pt.	16.4	26.4	9.5	101
Bromose	1.	2 cakes	19.6	24.	39.4	133
Nuttolene	8.75	.5 pt.	30.	30.	18.	139
Nut meal	8.75	.5 pt.	28.3	46.2	1.8	161
Protose	8.25	.5 pt.	20.3	10.23	1.40	57
Meltose	11.25	.5 pt.	3.87	.....	64.52	95
Beefsteak	.....	.....	19.3	3.6	.0	37

STOMACHS

AN eminent zoologist defines an animal as "a stomach with various organs attached." The definition is a very good one, and perhaps applies equally well to some men; but a human being ought to be something more than a stomach with other organs attached. The business of the stomach, as we have elsewhere seen, is to supply the body with the needed material to renovate its tissues and its energies. As soon as the stomach fails to do its duty, the whole body begins to decline. Every tissue begins to suffer from starvation. Every bodily process flags. The muscles become flabby, the nerves become irritable, the brain becomes confused, and the mental powers languish. The stomach is to the body what the furnace is to the steam engine. It receives the supplies of material out of which blood, brain, and muscle are formed, and which, through the wonderful chemistry of nature, are elaborated into thoughts, feelings, actions.

Importance of Proper Food.—The old German proverb, "As a man eateth, so is he," is an exact statement of a scientific fact. If a man eats gross food, his blood will be gross, his tissues will be gross, his brain will be gross, and he will have gross thoughts, and very likely will commit gross acts. The Concord

philosopher says, "The man who lives chiefly upon hog is in danger of becoming piggified." The young lady who lives chiefly upon pickles and bread and butter, with a liberal supply of mustard, washed down with strong tea or coffee, must be expected to have a temper as acrimonious as her diet. A man whose bill of fare consists chiefly of flesh food, must expect to find himself more nearly related to the animal in his instincts than the man who satisfies his palate with milk, fruits, and farinaceous seeds,—the primitive diet of the human family. Byron refused to eat flesh because, as he said, "It makes me ferocious." Writing in his journal in 1814, he said, "Meat I never touch. . . . The worst is, the devil always comes with it till I starve him out; I will not be the slave of any appetite." No man knew better than Byron, a man of strong appetites and passions, the influence of diet upon both mind and body. Many have recognized the same truth which he expressed, but comparatively few have shown the same resolution in making a practical application of it.

The man who wants to make the most of himself will take care that his body is built out of good material; in other words, will use discretion as regards the sort of stuff he puts into his stomach. The Hebrews could make brick without straw much more successfully than the system can make good brains out of strong coffee, Saratoga chips, and fried sausage.

The bustling business man sits at a table in a down-town restaurant, calls for a bill of fare, rattles off an order to the waiter, and presently finds himself surrounded with a dozen dishes containing as many

varieties of abominable mixtures called "French cookery." which he supposes his stomach will convert into material for brains, with which he will be able to devise sharp schemes for money-getting, and which will again convert brains into dollars. But the transmutation does not take place according to his calculations. Half an hour after dinner his abdomen swells up like a bass drum, his cranium feels like a cabbage head, his heart pounds away like a fire-engine, and he runs off to the doctor to get him to feel of his pulse, look into his eyes, and tell him if he isn't going to have a stroke of apoplexy, or if he isn't threatened with softening of the brain, from too much mental work, and if he would not better take a trip to Europe or visit some celebrated mineral spring, with a taste of sea water and a smell of perdition. If the doctor has the good sense and the bluntness of old Dr. Abernethy, he will say to him, "You are a fool and a glutton. Stop stuffing yourself with roast goose and cranberry sauce, fricasseed liver, pig's feet and *pâté de foie gras,* and making a gormand of yourself. Treat your stomach decently, and your brains will be all right."

Not Worth Eating.—When one sits at a hotel table, and observes of what sort of stuff people are trying to make bones, muscles, and brains, he is constrained to think that a human stomach must be made of cast iron, or that there is a day of trouble and retribution coming. If you ask any of those people if they ever suffer with indigestion, they will invariably reply with indignation in their tones, *"Never."* Watch the same people after dinner for half an hour, and you will see them gulping up offensive gases out

of their stomachs, drinking noxious drafts of alkaline mineral waters at the drug store, or swallowing big doses of some neutralizing cordial, never once thinking that the indigestible stuff which they bolted at the dinner table has anything to do with the horrible state of affairs under their jackets. Some years ago an itinerant clergyman, traveling through a Western State, spent a night with a farmer, and in the morning sat down with the rest around the breakfast table, to prepare for the long horseback journey which lay before him. The host invited him to ask a blessing upon the food about to be eaten. The reverend gentleman glanced over the table, taking a mental inventory of the food prepared for the dozen hungry mouths awaiting it. There were hot biscuits steaming from the oven, semi-transparent with lard, and yellow with saleratus; there were savory mince pies, rich preserves, pickles green as grass, coffee black as ink, fried pork, fried eggs, fried potatoes, and a generous supply of fried cakes on the sideboard. Pausing a moment, after his survey of the indigestible viands, with a solemn voice the clergyman said, "Friends, this breakfast is not worth a blessing," and concluding that a breakfast not worth a blessing was not worth eating, he went on his journey without it. The farmer doubtless considered the blunt preacher a very ungrateful guest, and it is doubtful whether the lesson was of any practical value to him; but certain it is that a great share of the breakfasts and dinners eaten are not fit to be blessed or to be swallowed.

Food, to be worth eating, must consist of such material as will properly nourish the body, and in

such form as will be easily digested. It is also necessary for the welfare of the body that the food should consist of different nutritive elements in proper proportion. A man who undertakes to live upon sugar, or fat, or starch, or albumen, exclusively, will die almost as soon as a man who eats nothing at all, although a mixture containing each of these elements in proper proportion is capable of sustaining life indefinitely.

How Much to Eat. — Given proper food, properly prepared, one of the first questions which arises is, How much must a person eat to sustain life and keep himself in good working order? Everybody knows the story of Cornaro, the dissipated Italian who found himself a wreck at thirty; but who, by adopting a simple diet, consisting of twelve ounces per day, was able to prolong his life to a full century, and found himself when an octogenarian more active and vigorous than when a youth of twenty. A Frenchman lived for many years, working hard and preserving good health, on fourteen ounces per day. On the other hand, a Roman emperor ate as many pounds of meat per diem, and an Eskimo has been known to eat as much at a single meal. The amount of food required varies with each individual, with weather changes, and with the kind and amount of labor performed. The only proper guide to the quantity of food is a healthy appetite; and when the palate is not tickled with savory comestibles, and the appetite stimulated by irritating condiments, nature will invariably say, "Enough," when a full allowance has been taken, by substituting a sense of satiety for the keen relish of hunger.

Relation of Climate and Occupation to Diet.—As regards the influence of weather and occupation upon eating, it may be briefly said that we need to consume more food in cold weather than during the warm season, for the simple reason that one of the most important uses of food is to furnish fuel to keep us warm. In cold weather, the consumption of fuel in our bodies, as well as in our stoves and furnaces, is necessarily greater than in the warm season; and hence we need a larger supply of food. Hard muscular labor, accompanied by active mental occupation, consumes the greatest amount of tissue in a given time, and produces the demand for a larger amount of food than either purely physical or purely mental occupations. The hard mental worker really requires as much food as the muscle worker, but should remember that he can indulge in excess with much less impunity. The woodsman, whose monotonous occupation makes of him practically a mere chopping machine, consumes without apparent harm, several pounds daily of coarse and indigestible food, and a surplus of bodily energy enables him to digest what would be absolutely poisonous to a brain worker of sedentary habits, who can take with safety only just so much as his system actually requires. For the average man, the amount of food required each day probably varies not far from one and one-half pounds of dry graham bread, or its equivalent in other foods.

Danger of Eating Too Much.—There is vastly more danger of eating too much than too little. The mother who fears her child may starve to death before morning if sent to bed without its supper, would un-

doubtedly find it difficult to believe that Dr. Tanner could live forty days without tasting food, a period which has been in other instances of fasting considerably exceeded. The manner of taking food is a matter of quite as great consequence as the quantity eaten. The very best food, hastily bolted, after the fashion of the average American, may be digested less perfectly than food naturally difficult of digestion, but which has been deliberately and thoroughly masticated. It is reported of Mr. Gladstone that he required his children to make forty movements of the jaws for each mouthful of meat before swallowing it; and if the ex-prime minister himself followed the same rule, this may possibly be one of the secrets of the remarkable strength of mind and body which enabled him to do more work at the advanced age of fourscore years than most of his countrymen are able to do at half that age. The tendency to hasty eating may be greatly lessened by the avoidance of liquids at meals. The free use of drinks at meals is also objectionable, as it dilutes the contents of the stomach to such a degree as to overtax the absorbents, and thus delay the digestive process. Persons who are troubled with thirst at meals, may avoid the necessity of drinking while eating by taking a glass or two of water an hour before the usual time for eating.

Evils of Hasty Eating and Overeating.—The symptoms which result from hasty eating and overeating are very similar. Indeed, the two processes are very likely to be combined, as one who eats too fast is very likely to eat too much. The most common sensations after excess or abuse of the digestive organs

in this way are a sense of fulness at the stomach and drowsiness after eating, which are pretty likely to be followed an hour or two later by eructations of gas, with heartburn or sour stomach, the result of fermentation of the food. After a time, the digestive organs may become so weakened that even a small quantity, though properly eaten, will be very imperfectly digested, and the whole system suffers in consequence.

Indigestion is something more than simply an inconvenience. A body which is served with food by a dyspeptic stomach, receives very poor material of which to rebuild its tissues. None of the food is perfectly digested, and hence the quality of all the tissues is deteriorated. Besides this, the septic changes which take place in the stomach and bowels produce various poisonous substances, which are absorbed along with the food, and which poison and irritate the brain and nerves, and produce various disorders and discomforts which are ofttimes attributed to other causes. Even the imperfectly digested food is treated by the system as waste or poisonous material, and instead of being used to repair the wastes of the body, is excreted, or thrown off, by the liver and kidneys with the waste elements of the system.

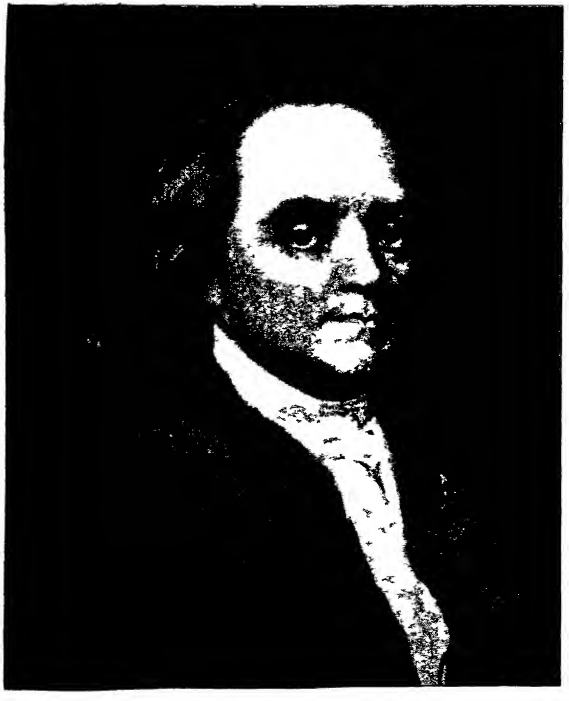
The stomach sometimes holds up wonderfully under the heavy burdens laid upon it, and digests a much larger amount of food than is necessary to supply the wants of the body. In such cases, the excessive amount of nutriment received is either at once excreted, or accumulates in the tissues, clogging the various organs and interfering with their proper activity. Accumulations of this sort are the chief cause of gout,

rheumatism, biliousness, and numerous other disorders which are usually attributed to other causes.

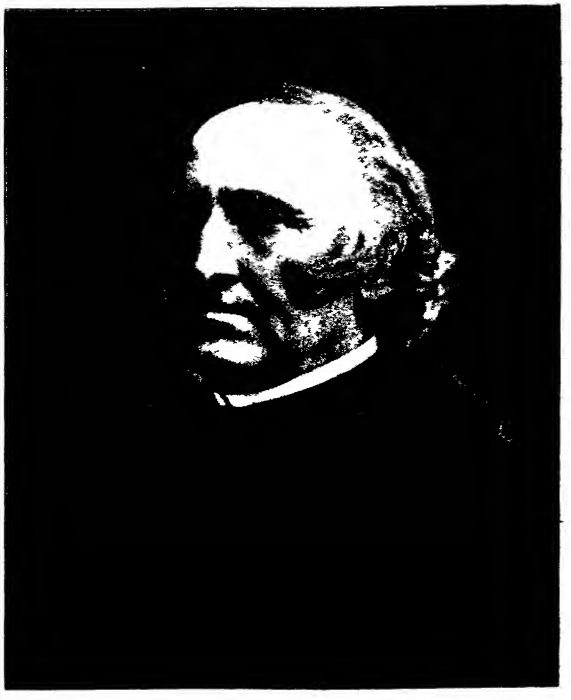
Eating when tired, and engaging in active mental or physical exercise immediately after a hearty meal, are two of the most common sins against dietetic rectitude in our modern civilization. An old medical writer tells us that a hundred years ago it was the custom among the merchants of Edinburgh to take two hours' "nooning" for dinner in the middle of the day, during which time the shops were closed, and all business suspended. It is quite hopeless to attempt a resurrection of this good old-fashioned custom in these fast times; and the best thing we can suggest is that no hearty meal should be eaten during the active business hours of the day, unless at least an hour or two can be allowed after the meal has been taken, to give the stomach opportunity to get the digestive process well under way. The plan which experience leads us to recommend is to defer the hearty meal, as did the old Romans, until the latter part of the day, say three or four o'clock in the afternoon, taking, if necessary, an apple, a bunch of grapes, an orange or two, or other fruit, at midday, to appease the clamoring of the stomach, until it has become accustomed to the lengthened interval between the first and second meals. Two meals a day are in every way preferable to a larger number. The ancient Greeks and Romans took but one meal per diem. During the republican era, the Roman custom was to eat twice a day, breakfast being simply a light repast of fruit and bread. At the present time, the two-meal-a-day plan prevails quite extensively in France and Spain, and especially among the

better classes. The inmates of the hospitals in Paris are supplied with but two meals a day. The same is true respecting the soldiers of the French army.

A Carnivorous Appetite.—When the practice of meat-eating was introduced into the human family, history does not positively inform us, but certain it is that primitive man was not carnivorous in his habits. In this one thing, at least, Darwin agrees with Moses. Bible accounts represent man in his primitive innocence as subsisting wholly upon the fruits of the soil. Darwin professes to trace back the origin of the human family to the megatherium, a four-handed beast that obtained its sustenance from the fruits and ground-nuts of the primeval forests through which it roamed. Pythagoras, one of the most renowned of Grecian philosophers, was a rigid vegetarian, as were all his followers. More than one modern philosopher has found himself able to do his best work when imitating the plan of Byron, who, during his stay in Venice, wrote to a friend, "I stick to Pythagoras." Plato and Seneca, two other celebrated philosophers, were vegetarians, as were also Shelley, and Benjamin Franklin, at least during a portion of his life. The great Newton, while writing his most celebrated mathematical treatises, abstained wholly from animal food. Wendell Phillips, the "silver-tongued orator," informed the author a few years before his death that for fifty years he had been a practical vegetarian, and rigidly so during a considerable portion of the time, though while traveling about the country, he sometimes tasted a little fish when meagerly supplied with wholesome vegetable food. The author of



BENJAMIN FRANKLIN.



WENDELL PHILLIPS.

"Little Women," as well as the little women themselves, as we were informed by her father, the eminent Concord philosopher, were all vegetarians. The author has been a vegetarian for nearly forty years; and from personal experience is convinced that the practice is in every way conducive to health, and is capable of sustaining mental and physical strength during protracted and most arduous labor, both physical and mental.

Trichina, tapeworm, and other parasitic diseases, besides consumption, possibly scrofula, and some other constitutional maladies, are liable to be contracted by the use of the flesh of diseased animals. Certain it is that the use of animal food may be discarded with perfect safety. Eggs are a perfect substitute for flesh of all sorts.

A Few Prescriptions

FOR SICK STOMACHS

A SOUR STOMACH.—Said a lean, cadaverous-looking man to the author one day, "My stomach is just like a swill barrel." The expression, though not elegant, was certainly appropriate as well as significant; for no sooner would the poor man swallow his dinner than it became converted into a sour, fermenting mass, which he was soon glad to rid himself of, provoking vomiting by thrusting his finger down his throat. In this wretched condition he had been for months, indeed, much of the time for years, and had sought relief from doctors of all pathies, and from patent medicines of every description, until at last he was almost in despair of ever being rid of his "tormentor," as he styled his dyspeptic stomach.

In six weeks the patient was well, and had added to his avoirdupois an average of one-half pound per diem, by eating natural food prepared in a simple way, discarding flesh and animal fats.

An All-Gone Feeling.—"There is such a terrible, all-gone feeling at the stomach. I feel as though I wanted to eat all the time, and yet nothing satisfies me," said a fashionable lady patient one day.

"What do you eat?"

"Oh, beefsteak, bread and butter, tea and coffee, vegetables sometimes—whatever I like."

"Pickles?"

"Yes, always. I can't eat anything without pickles."

"Mustard on your meat?"

"Of course. If I don't eat mustard, meat always lies heavy on my stomach. It doesn't seem to digest."

"You take your coffee pretty strong, I suppose?"

"Yes, I want it good or not at all. None of your dishwater for me."

"You take ice-cream after dinner, sometimes, do you not?"

"Oh, yes, most every day in hot weather. No harm in that I suppose—it is so cooling."

"Don't eat anything between meals?"

"Yes, I do. I have fruit cake or candy or something else good close at hand all the time, and eat whenever I get hungry."

"You eat considerable confectionery, then, do you?"

"Oh, not so very much. There is a five-pound box of peppermint drops over there my husband just sent me. That will last me almost a week."

"There are some more boxes over there just like this one. Do they contain peppermint drops, too?"

"No; I have eaten those up. In the last five weeks I have eaten just twenty-three pounds of those peppermint drops. You don't think they will do me any harm, do you?"

"Oh, no! Peppermint oil applied to your skin, the tough outside covering of the body, will raise a blister; but a stomach that has been abused like yours probably has no more feeling than an old boot. I presume you could take half a pint of peppermint oil, and could eat mustard and red pepper like a Mex-

ican, without knowing that there was anything unusual happening in your stomach, unless it were a little extra touch of 'all-goneness' an hour or two afterward. The trouble with your stomach, madam, is total depravity. It has been so abominably treated that its natural tone and vigor are 'all gone,' and it is of little more consequence to you than a leather bag.

"It isn't any wonder that your face is pale and haggard, your cheeks thin, your naturally fair skin covered all over with unsightly brown patches, and that you are so afflicted with general good-for-nothingness. Your blood is thin and poor for want of well-digested food. Your nerves are irritated with exciting and irritating condiments, and your liver is half paralyzed by its frantic efforts to dispose of some of the wretched stuff you have been putting into your stomach. The wonder is you have not died of starvation, of spinal anemia, or inflammation of the stomach, or winter cholera, or some other proper kind of punishment for your unnatural treatment of your digestive organs.

"If you expect to get well, you will have to turn over a new leaf immediately. Throw away your spices, condiments, confectionery, and ices, and stop eating between meals. Take only the most simple food twice or, at most, three times a day. You will soon find yourself getting more enjoyment out of a simple, natural dietary than you ever dreamed of finding in the richest and most highly seasoned viands. You will have better blood; your system will make better brains and nerves, better muscles, and a better liver. The dingy brown hue will disappear from your skin, your

eyes will resume their natural brightness, the horrid, nasty taste will get out of your mouth, and the 'all-gone' feeling will be all gone."

She didn't like to give up her tidbits and peppermint drops, but she so longed to get rid of those ugly brown patches, which "French chalk" and "magnolia balm" would not cover up, that she reformed; and although "a leopard may not change his spots, nor the Ethiopian his skin," this fashionable woman changed hers.

Consumption or Dyspepsia, Which?—"Doctor," said the mother of a lad of seventeen, as she brought him into the office, "I want you to tell me if this boy has consumption. He has been growing thinner and paler and weaker every day, until I have been obliged to take him out of school, and I am afraid he isn't going to be good for anything."

"Have a seat, madam, and I will look your boy over.

"Take off your coat and vest, sir,—shirt, also, if you please. Now stand up before the light here and let me see you breathe. Chest flat, shoulders round, lungs evidently rather weak. Haven't very good wind, I guess. How far can you run without getting all out of breath?"

"I can't run at all. Can't even walk very fast; it makes my heart beat so that it seems as though I couldn't get my breath."

"Now let me listen at your chest with the stethoscope while you take a deep breath. That will do. Now hold your breath a few seconds while I listen at the heart. Very good. Now let me see your tongue.

A thick, yellow coat on it. You have a bad taste in your mouth in the morning?"

"An awful nasty taste."

"Have a good appetite?"

"Sometimes want to eat all the while, and other times can't eat at all."

"Have the headache sometimes?"

"Have sick headache every Monday morning."

"Have any bad feelings in your stomach?"

"It seems as if there were a big stone there after every time I eat."

"Bowels regular?"

"Have to take a dose of pills every other day, or they wouldn't be."

"Do you have any indigestion?"

"I don't know; but I have something that comes up into my mouth and scorches my throat worse than red pepper, after almost every meal."

"What do you eat?"

"Oh, I eat most anything I like. I didn't suppose it made any difference what I ate."

"You like ham and eggs, fried sausage, 'Welsh rarebit,' mince pies, doughnuts, griddle cakes, fried oysters, and stewed lobsters?"

"Oh, yes, I like all those things, and a good many more."

"Madam, it is plain that this boy has no consumption, but it is equally clear that he has a full-grown dyspepsia."

"Do you think so, Doctor?"

"It is perfectly evident, madam."

"Old Dr. M——, who examined him a few weeks

ago, said that he was 'going into a decline,' and that I would better take him out of school, and give him a change of climate."

"He is already in a decline, madam. A change of climate won't do him any harm, but what he most needs is a change of diet."

"What do you think I would better give him to eat, Doctor?"

"Give him plenty of good fruit and grains, no flesh foods, eggs occasionally, and all the good sweet nuts he will chew well."

"What sort of grain preparations do you think would be best for him?"

"Well, let him have oatmeal mush or cracked wheat for breakfast, grits, rice, and boiled peas or beans for dinner, with good graham bread at both meals."

"But he doesn't like grains, Doctor."

"Very likely; but he must learn to like them."

"Do you think such light diet would be sufficiently strengthening for him? You know his blood is rather thin, and he is pretty weak. The other doctor said that I ought to give him very hearty food, as he needs to be built up; and he gave him some 'beef, wine, and iron tonic' to take."

"A light diet, do you say, madam? Why, one pound of oatmeal or cracked wheat is worth three pounds of beefsteak for nourishment, and is a good deal easier to digest than fried oysters and those other abominations your son has been eating."

"But what about the supper, Doctor?"

"Well, if he must have a little supper, let him take a glass or two of milk, with a little stale bread and

fruit; but his digestion is so slow, he will be a good deal better off without anything at night. His sleep will be sounder, and when he wakes in the morning, he will pretty soon be rid of that 'awful nasty taste' in his mouth, and have a better appetite for breakfast. Try my prescription, and before a month's time you will be convinced that it is a good one."

The prescription was tried, not one month, but six months—a year, in fact; and now the pale, weak lad has grown to be a tall, broad-shouldered, muscular young man, with stout lungs, good digestion, and no more indications of an approaching decline than a growing pumpkin.

BILIOUSNESS

"IF you can only get this bile off my stomach, Doctor, I think you can cure me," said a young man who had come from another State for advice regarding his health.

What makes you think there is bile on your stomach, sir?

"Because I feel so bilious all the time. When I get up in the morning, my head feels as though it were made of wood. My mouth tastes as though I had been chewing old brass, and it takes me two or three hours to get my brain waked up enough so I can begin to think straight. My bowels are so costive I have to drink a bottle of vile mineral water every morning and night of my life, or they never would move. My skin, which used to be as fair as a girl's, is as dingy as though I never took a bath in my life. I see black specks before my eyes nearly all the time, and every little while get so dizzy-headed I can hardly walk. Now if this does not show that there is too much bile on my stomach, then what does it indicate?"

"Too much bile," did you say? My dear fellow, the trouble is you have not bile enough. There is no bile at all on your stomach. If you had bile on your stomach, you wouldn't be here. You would be at home laid up in bed, patronizing a cuspidor, and sending out for a doctor to come and stop your turning yourself

inside out. When bile gets on the stomach, it doesn't stop there; it either goes up or down very suddenly. The stomach knows its business too well to allow bile to lie around loose in it for weeks and months, or for any length of time.

"But I vomit bile sometimes."

Certainly. And if you had bile on your stomach, you would be vomiting this minute, as I have just intimated. But the bile very rarely gets into the stomach unless a person is nauseated so that the intestines get to working the wrong way, and carry the bile up from the place where it enters the small intestine, a few inches below the stomach, into the stomach itself.

"Well, I believe that is what is the matter with me. It seems as though things had been working the wrong way down there for six months back, and one day I am sure there was bile on my stomach. I was awful sick, and sent for the doctor; and when he came, he gave me a dose of ipecac, and I vomited and vomited and vomited till I believe everything I had eaten for a week came up, and then came along a lot of bile as black and bitter as tan bark. I felt better for several days; and then it seemed to me as though the bile began to accumulate again, and I have been feeling worse ever since. I believe if you would give me a good emetic, I should feel better right away."

No, you wouldn't. You would feel worse immediately, though you would probably feel better after the skirmish was over; but I am not prepared to see all you have been eating for a week just at present, so I guess we will postpone the emetic, if you please.

"But about that bile?"

You have not convinced me yet that there is any bile on your stomach to be moved off, as you seem to believe. When a man gets to vomiting, and everything gets to working up toward the mouth, the bile is raised from the small intestine to the stomach by the violent efforts made in retching, or vomiting, while at the beginning of the attack there may have been none at all in the stomach.

What Is Biliousness?—Biliousness is a condition of the system in which there is too little bile produced, instead of too much. The waste elements, which ought to be removed from the blood by the liver in the form of bile, are left in the body, and accumulate in the tissues. It is this that gives the dingy color to the white of the eye, the dirty hue to the skin, and the coppery taste to the mouth, and which produces the giddiness, the floating specks before the eyes, and the general feeling of languor and discomfort which characterizes the condition commonly known as biliousness. This dingy hue of the skin is actually due to the accumulation of waste matter, or organic dirt. The skin is dirty, perhaps not upon the surface, but all through its structure. Not only the skin, but the muscles are dirty. The brain and nerves are dirty. The whole body is clogged with dead and poisonous particles which ought to have been promptly carried out of it, but have been retained on account of the inefficient action of the liver.

Too Much Bile.—"But don't you think it is possible, Doctor, for a person to have too much bile?"

It may be possible, but is scarcely probable. Did you ever know of a person's having too much gastric

juice or too much pancreatic fluid? But if it were possible, such a condition would not be likely to produce any of the symptoms which accompany biliousness.

"Very likely you are right, Doctor; but I would really like to know what causes this horrible biliousness that makes a man get up feeling as though he were going to be shot, or had committed the unpardonable sin, or that some horrible calamity were about to befall him."

Causes of Biliousness.—The causes of biliousness are various. One of the most frequent is overeating. If you press your fingers close up under the ribs on the right side of the body, you can feel the lower border of the liver about an inch above the lower edge of the last rib. If you do the same after having eaten a hearty meal, you will find the lower border of the liver half an inch lower down. This is due to the fact that the liver becomes enlarged through the absorption of digested food after a meal has been taken. If you eat a very large meal, say twice as much as you usually eat, and then feel for the lower border, you will find it reaching down to a level with the lowest rib, showing that the liver is very greatly enlarged, much more than it should be. If you go on eating too much in this way, day after day and week after week, after awhile the vessels of the liver will be so relaxed by frequent distention that the organ will grow permanently enlarged and congested. When in this condition, the liver cannot make bile readily, and so does not do the proper amount of work, and the waste elements which it ought to remove from the body are

left to accumulate in the tissues, and all the symptoms of biliousness follow.

Biliousness is sometimes the result of eating too freely of fats. Animal fats being particularly difficult to digest, and likely to be taken in too large quantities in the shape of butter, lard, suet, and fat meats, are apt to produce this condition.

Some years ago, a French physiologist fed to various animals liberal supplies of fat, and then observed the quantity of bile produced. He found that the amount of bile was lessened just in proportion to the amount of fat added to the food. In order to ascertain the reason for this result, he killed some animals, after having fed them freely with fat, and examined their livers with a microscope. By this means he discovered that the little cells which chiefly compose the liver, and which form the bile, were crowded full of little drops of fat, and were thus so burdened and hampered in their work that they were obliged to work very slowly, and hence produced only a small quantity of bile.

Similar experiments show that the excessive use of flesh food also renders the liver torpid, and produces biliousness. Flesh food generally consists of albumen, a nitrogenous substance, which can be used in the body only in a very limited amount. The average person can use only three ounces of this kind of material each twenty-four hours. Now if a person eats several times this amount in the form of beefsteak, mutton-chop, or any other flesh food, the superfluous amount must all be removed in the form of waste matter. That is, if the person eats meat sufficient to

supply four ounces of nitrogenous matter, the extra ounce must be carried off by the kidneys in the form of urea, or uric acid, and this must be acted upon by the liver to prepare it for removal by the kidneys. If the liver has more of this work to do than it should have, the work will be imperfectly done, and much waste matter which ought to be removed will be left in the system, producing biliousness, rheumatism, muscular pains, sick headaches, and many other uncomfortable symptoms. Persons suffering from these causes will often notice sediment in the urinary secretion. This is, in fact, one of the most common causes of the sediment, or deposit, ordinarily found in the urine.

Cause of Spring Sickness.—"Doctor, do you suppose the facts you have stated respecting fats and flesh food explain the reason why one loses his appetite for such substances, and craves fresh vegetables, acids, etc., in the spring of the year?"

Certainly, sir. The repugnance to rich foods and flesh food, which nearly every person feels in the spring, is nature's protest against the use of those articles at that season of the year. During the winter season, the extra supply of oxygen received in the condensed atmosphere enables the system to dispose of waste matters more readily than during the warm season; and hence those substances which tax the liver and encourage the accumulation of waste matter, can be taken with greater impunity during the cold months; but when warm weather approaches, the accumulation of waste matter soon becomes so great that nature makes a vigorous demand for a change of habits in the

matter of diet. If nature's suggestion is not readily received and acted upon, she follows it up with a vigorous reminder in the shape of a "bilious attack," "spring sickness," a "gastric fever," an attack of "liver complaint," diarrhea, or some other expression of her displeasure at the treatment she receives.

Condiments and Biliousness.—Still another cause of biliousness, arising from torpidity or inactivity of the liver, is the use of condiments and such substances as mustard, pepper, pepper-sauce, ginger, Worcestershire sauce, vinegar, and other things which have an acrid or burning flavor. How any one could ever have learned to relish substances which burn and sting as they go down the throat, is one of the mysteries of dietetics which we have never been able to solve. Certain it is that a substance which will raise a blister on the skin in fifteen minutes, as mustard or cayenne pepper will do, is capable of doing mischief on the inside of the liver when it gets there through absorption from the stomach. If you put a little pepper in the eye, it makes the tears flow, and presently the eye becomes bloodshot. Mustard or pepper in the liver does not make it smart, as it has very few nerves of feeling; but it causes the blood-vessels to enlarge, and probably at first increases the amount of bile produced; but the effect of continued use is just the same as would be the effect upon the eye, if a little pepper were put into it every day. Such an eye would after awhile become so inflamed that it would be bloodshot and congested all the time. So the liver, by the habitual use of condiments, becomes permanently congested; and a congested liver is a torpid liver, capable of mak-

ing less bile than is necessary to maintain the system in a state of health.

"But, Doctor, food is so insipid without any seasoning. You don't really think a little mustard on meat, or pepper in soups and on vegetables, does any particular harm, do you? It seems to me that I feel better when I add a little pepper or mustard to my food. If I don't have it, food seems to lie heavy on my stomach."

A Whipped Stomach.—Evidently, your poor stomach has got so used to being whipped, it won't work without whipping, like a lazy horse that has become so accustomed to the lash that it does not know it is required to take a faster gait until the whip is applied vigorously. And your poor liver is doubtless just as sluggish as your stomach, only it has been whipped so long and has become so weak from trying to do all the extra work demanded of it, that it won't work at all, even if it is whipped with mustard, pepper, pepper-sauce, and the other means by which people goad their stomachs and livers into doing more work than they are really able to do. I suppose you take a dose of salts now and then, and feel better right away afterward, don't you?

"Yes, that is just what I do. I was brought up on salts. As early as I can remember, my mother gave me a dose of salts along with the rest of the children every two weeks regularly; but lately my liver has been getting so torpid the salts do not seem to touch it, and I have to go to the doctor and get a dose of calomel every now and then."

That is about the way most people do. After they have whipped and goaded their livers until they have become so tired and weak they will not respond to any ordinary whipping, then they run to the doctor for some cat-o'-nine-tails sort of medicine with which to exasperate the poor organ into doing what it is really too weak and feeble to do.

Breathing and Biliousness.—But there is still another cause of biliousness which is quite frequently overlooked. The liver needs oxygen to carry on its business of bile-making and sugar-making and the various other kinds of work it has to do. The amount of oxygen in the blood depends upon the amount of air taken into the lungs. If a man stops breathing, he very quickly gets black in the face, because the oxygen of the blood is consumed so rapidly that the blood quickly acquires the dark color it has when it contains little or no oxygen. If we exercise out of doors on a cold winter's day, we come in with cheeks and lips rosy with the glow of health, because they are filled with bright blood, rich in oxygen. When we sit quietly indoors in heated rooms, and take little or no exercise out of doors, we do not expand our lungs well, and consequently receive very little air into the blood, and the little we inhale is poor in oxygen. Consequently, the whole body suffers for want of this life-giving element, and the liver with the rest. Not being able to make bile without oxygen, and its supply being insufficient, it makes too little bile, and allows the waste elements which should have been removed through this channel to accumulate in the body. Thus a person becomes bilious from sedentary habits.

This starch it stores away in its tissues, and this, by the way, is one reason why the liver is larger after a meal than before; it is filled up with liver-starch. In the interval between one meal and the next, this liver-starch is slowly converted into sugar again, and allowed to enter the system, a little at a time. Now if a person eats too much sugar, the liver will have more of this starch-making business than it can do, without neglecting other work, and consequently will get behindhand with its bile-making. So a person who eats too much butter, sugar, confectionery, etc., gets the "blues," and has to pay smartly for his indulgence of his sugar tooth.

But to resume our prescription. Abstain from animal fats, flesh meats, sugars and sweet sauces, pastry, rich foods of all sorts, spices and other condiments. Be careful not to eat too much. Let the diet consist chiefly of fruits and grains, with a liberal allowance of milk. Take one or two oranges half an hour before each meal. A lemon now and then, or a glass of lemonade, either cool—not cold—or hot, according to your fancy, and taken some other time than at meals or just after eating, will be found serviceable. One hour before each meal, drink two glasses of hot water, hot as you can swallow without inconvenience. Repeat the dose half an hour before going to bed at night.

On retiring, wring a towel out of cold water, dry enough so it will not drip, and place it around the body over the liver, and cover with two or three thicknesses of dry flannel. In the morning, remove the bandage, and dipping the hands in cold water, rub the surface, and then dry it with a linen towel. Beat the chest vig-

orously over the region of the liver for five minutes. Rub and knead the bowels for another five minutes. Every other morning, take a hand bath, using water at a temperature of seventy-five to eighty degrees, just dipping the hands in the water, then rubbing the surface of one part of the body at a time, drying the part immediately, before proceeding to another part, and so bathing the whole body. Be sure to get up a good glow.

Every day walk five miles in the open air, with the shoulders well thrown back, head erect, and with a vigorous step. Don't try to do much of it before breakfast; one mile at that time is enough. Divide the balance between the forenoon or afternoon and the evening, just before going to bed. If you can bring yourself to adopt the plan of eating but twice a day, your poor, tired liver would be very grateful for the little vacation which you would give it between the last meal and the first meal the next day. This will give it time to contract down to its proper size, to empty itself of blood, and clear away all the old liver-starch it has been storing up, and to get a good store of bile ready to help digest the next meal, and at the same time clear away the dirt from the brain and the rest of the body. Dispensing with the third meal will do more in getting rid of the morning "blue devils" than anything else can do.

"But, Doctor, I don't see how I am going to do all that. I always did like good victuals, and I had so much oatmeal and that sort of stuff at boarding school that I never could bear it since. Don't you think you could give me something I could take that would

cleanse my blood and stir my liver up, in place of this diet, and bathing, etc.? And besides, I don't see how I can get the time for that five-mile walk. I don't believe I have walked five miles in one day in as many years."

I see you are just like most other sick people. You want us doctors to help you to find out some way of cheating nature. You want to do as you please, gratifying a depraved appetite, neglecting all hygienic rules, violating the laws of nature as much as you please, and then ask us to give you some little drops of medicine which you can swallow and undo the consequences of all this physical sinning. Let me tell you, young man, nature was not such a fool as to make laws with penalties attached, and then provide easy ways for avoiding proper punishment for their violation. What would you think of a government that would make a law requiring imprisonment for theft, and then place in the hands of each culprit, as he was turned into his cell and locked up, a key by which he could unlock the prison door and let himself out any moment he chose to do so?

Nature says, "If you gorge yourself with flesh food, if you swallow all sorts of greasy diet, if you apply mustard poultices to the inside of your stomach, if you make a hog and a glutton of yourself generally, and then sit down in an oven of an office all day, and smoke or drink beer with a lot of other silly fellows at the 'Club' at night, and habitually commit all sorts of other 'unnatural crimes' against your stomach and your liver,— if you behave in this sort of indecent way, you shall be condemned to suffer 'biliousness' to the

full extent of the law, and all the medical lawyers and pettifoggers in Christendom, regular and irregular, allopathic, homeopathic, electropathic, physiopathic, motorpathic, and those of no pathy at all, can't save you from the dismal dungeon of misanthropy and hypochondriasis into which I will plunge you if you don't speedily turn over a new leaf, and begin works of supererogation, such as swallowing a few pints of hot water every day to rinse your dirty blood and brain and muscles, and wash the old bile out of your liver and gall-bladder, and help to drive the wheels of your bile-making factory fast enough to make up for lost time. Why, young man, let me tell you something that perhaps you don't know. You are liable to be arrested any minute, and condemned to the torture bed of inflammatory rheumatism, which means six weeks of purgatory, lacking nothing but the brimstone to make it equivalent to the orthodox place of the same name."

"Well, well, I see it isn't hardly safe for a fellow to fool with his liver too much. I will try your prescription, but I don't hardly know about that hot water. Would it do any harm if I should put in a teaspoonful or two of brandy to make it go down better?"

Not a drop, sir. A teaspoonful of brandy would be just enough to antidote all its good effects upon the liver. You must take your water "straight."

"You will allow me to take mineral water if I prefer, won't you, Doctor? You know there is a good deal said nowadays about germs, etc., in drinking water, and the danger of poisoning from lead pipes, etc.; and besides, hot water is so flat. I don't believe

I have taken a glass of water without 'something in it' for six months."

Sorry I cannot accommodate you, sir, but I never prescribe mineral water. When we take water for medicine, it is water we want, and not minerals; and as to purity, a man of your intelligence and general information ought to know that most of the mineral waters come from the city water-works, with all their possible germs and a lot of other things, the original water being adulterated with various alkalies, salts, sulphurous gases, and other bad tasting and filthy smelling things, and then bottled and labeled as though it came direct from the bowels of the earth, although it is very likely that it would not be any better if it did.

"Well, Doctor, if I must, I must. I will follow your prescription for six weeks, and then if I am no better I shall say that I am a fool, and you are a ———"

Never mind, sir. At the end of six weeks you will say that you were a fool, but are growing wiser, and that I am your benefactor. I will stake my reputation that if you follow my prescription to the letter, you will never have occasion again to ask me or any other doctor to "get the bile off your stomach."

SEXUAL SINS

AND THEIR CONSEQUENCES

NATURE has guarded all the laws which she has made for the government of the functions of the human body by means of severe penalties, which are certain to be visited upon the reckless individual who lives in heedless disregard of the laws of health; and no form of physical transgression is followed by such terrific and unmitigated penalties as those which we are to consider in this chapter under the head of "Sexual Sins."

Self-Abuse, or Masturbation. — Self-abuse, or masturbation, is probably the most common, and certainly one of the most damaging, of all forms of sexual vice. The nature of the practice is unfortunately too well known to require any precise description, and it will suffice to say that it consists in exciting the genitals by mechanical means of some sort. There are, of course, no accurate statistics wherewith the extent to which this vice prevails may be determined; but there can be no doubt that the evil far exceeds in magnitude the estimates of those whose opportunities for observation have not been such as to give them an adequate idea of this dreadful physical and moral blight. For many years, the author has occupied a position which has afforded him opportunities for gaining information on this subject that has convinced him that very

few persons indeed properly understand the extent to which this evil prevails; and the results of many years' observation and very extensive research have convinced him that the vice has come to be, among boys at least, almost universal. He does not wish to be understood as intimating that there are not many noble exceptions. Undoubtedly, there are boys who escape the moral contamination which often leads to the formation of this habit at a very early age, but their number must be very small when compared with the great multitudes who, often at the very threshold of life, are introduced to this soul and body destroying vice. Somewhat extensive inquiry during travels in England and Continental Europe a few years ago, led the author to believe that the vice is somewhat less commonly practiced, at least among the peasantry of European countries, than in this country, which is perhaps due to the greater simplicity of habits, particularly in diet, and the forced habits of industry to which the young of both sexes are educated from a very early age, in the countries referred to. A medical author of some prominence declares that in Russia the practice is universal among the young of both sexes.

That the practice prevailed, to some extent at least, in ancient times, is evidenced by the frequent allusions to it in the writings of ancient medical authors. Hippocrates, the father of medicine, refers to the practice, and describes the terrible consequences which follow its indulgence under the name of *tabes dorsalis,* a picture of which he draws, and as faithfully portrays the condition of the unfortunate victims of this horrible vice as if the description were written by a modern

medical author, instead of the great Grecian physician who flourished more than two thousand years ago.

The vice of self-abuse seems to be almost entirely confined to the human species. It is readily acquired, however, by some animals, particularly the monkey.

Causes of Self-Abuse. — First of all causes which may be mentioned, are evil associations. No better illustration of the language of the Bible, "Evil communications corrupt good manners," can possibly be found than is afforded by the constant propagation of this fearful evil through evil associates. Both public and private schools afford excellent opportunities for corrupt lads to contaminate their fellows; and that these opportunities are well improved, may be confirmed by the testimony of almost any schoolboy. Probably there is not one boy in fifty, above twelve years of age, in attendance at our public schools, who does not know more or less of this degrading vice, having gained his information, perhaps, at a very early age from some evil associate. Primary schools are often nurseries of vice as well as of learning, and the author has had good reason for believing that in some schools of this class the vice has prevailed so extensively that scarcely a single pupil has escaped its blighting influence. A boy of tender years is sent to one of these schools from the seclusion of home, where he has been carefully guarded from every taint of vice and vulgarity, and is almost instantly set upon by boys of his own age or older, and instructed in the filthy practices in which they are already adepts. The little fellow, ignorant of the nature of the vice, falls an easy prey to it, and only learns the evil, physical

and moral, when he has become so thoroughly entangled in the toils of the habit as to make escape all but impossible; or when, at a still later hour, he awakens to the fact that his manhood is gone, his intellect weakened, and himself become a physical, mental, and moral wreck.

Boys are sometimes led astray by this alluring vice, even before they are sent to school. Fond parents may imagine that because their children are not allowed to run upon the streets, are kept from the public schools, and carefully guarded within the precincts of home, they certainly must be pure and free from this all-destroying vice; but we have often discovered its existence in small boys whose parents were ready to stake their lives upon their innocence, so blind and ignorant were they respecting the possible sources through which contamination might come. Visits from neighbors' children, allowing boys to sleep with other boys of their own age or older whose habits are not known, a casual acquaintance formed in the back yard, through the garden fence,— all these opportunities may be sufficient to sow the seed of physical and mental ruin.

Sometimes children yet "in arms," even nursing infants, are taught the vile practice by ignorant or wicked nurses. In some European countries, nurses habitually resort to this means of quieting troublesome infants; and we have met some instances in which this reprehensible practice had been resorted to by nurses in this country. The horrible results of such a practice may be more readily imagined than described in these pages, and the possibility of the evil's originating in this way should lead mothers to exercise

the greatest caution in the selection of those who are to have the care of their children, even those of the tenderest age. Those who are themselves addicted to this evil practice, often have a horrible anxiety to communicate the vile knowledge which they possess to their companions, and never let an opportunity slip for instructing some one in the same filthy practices of which they are guilty.

We have met, however, a good many cases in which the victims of the habits declared most firmly that they had never received any instruction of this sort. How the habit was begun, they could hardly tell, but thought it to be the result of accidental discovery. Frequently, local irritation of some sort will produce an abnormal excitement of the parts, which leads to the disclosure of the fatal secret. A constipated condition of the bowels, the irritation of thread-worms in the rectum, and particularly irritation arising from inattention to local cleanliness, may give rise to the habit by provoking rubbing or scratching of the parts. The condition known as *phimosis,* elsewhere described, and abnormal length of the prepuce, either of which may cause retention of the normal secretions, and provoke an abnormal amount of secretion, are undoubtedly frequent predisposing causes of this practice.

Among the most potent of predisposing causes of the practice must be mentioned bad diet. Excessive use of flesh food and the use of condiments have a powerful influence in producing an abnormal irritability of the nervous system, and the special local excitement and irritability which favors the early development of sexual feelings, and stimulates them in

the most marked degree when once aroused. The boy whose blood is made hot and feverish with stimulating food, whose nerves are irritated and excited by mustard, pepper-sauce, and other exciting condiments, is poorly prepared to resist the temptations to sexual indulgence which are certain to come to him when he mingles with other boys on the street, at school, or wherever he may come in contact with them. A man rushing through a burning building, among blazing fagots, with sparks flying in every direction, with tongues of flame darting at him from every side, would be considered very reckless if he should venture to carry with him upon his arm an open bucket filled with gunpowder, or if he should smear his clothing with pitch, oil, or other inflammable material; but such a man would be in no greater danger than the lad whose blood is inflamed with heating, stimulating food when he goes out to mingle with the world, and meets on every hand the tempting allurements which are certain to assail him.

The use of tobacco must also be looked upon as a predisposing cause of sexual vice. Tobacco stimulates and inflames the nerves, and produces a premature development of the sexual nature. Tobacco-using boys invariably have a senile appearance. They are old for their years. Not only this, but the habit of tobacco-using leads to association with boys who are addicted to sins of various sorts, and who readily communicate their corrupt practices to their associates.

The whole life of the average city boy, brought up in the usual way, tends to develop abnormally the worst side of his nature. Almost as soon as he is born, the

depraving process begins. His nurse envelops the lower portion of the trunk in many folds of diapers, which produce abnormal heat of the parts, and consequently abnormal development. Through the inattention of careless nurses, these diapers are not always changed as soon as they become soiled, and the retained secretions irritate and still further excite these parts. Sometimes, also, the evil is aggravated by covering the many folds by oil or rubber cloth, or some other impervious material. Continued for several months, sometimes two years or more, this practice must necessarily result in producing local irritations and excitements which tend very strongly in a vicious direction.

Obscene Literature.—With older boys, the reading of vile books and the circulation of obscene pictures have been a most potent cause of the propagation of vile practices of every sort. By means of foul stories and vile pictures, the imagination becomes corrupt, the love of and respect for purity is destroyed, the barriers against vice are broken down, and the boy becomes an easy prey to corruption of every sort. A few years ago, this evil became so extensively prevalent, and the business of publishing and circulating vile pictures and literature was carried on so openly, it became evident that something must be done to suppress it. An Eastern philanthropic gentleman formed an association for the purpose of accomplishing this object, and secured the passage of laws which enabled them to suppress the circulation of obscene books, pictures, and kindred articles through the mails. Mr. Anthony Comstock was made the executive agent of

the Society, and through his labors, a great reform has been accomplished. The vile traffic has been suppressed to a very great degree, and it is to be hoped that a very active agent in propagating the vice has been permanently crippled.

In the sixth annual report of the Society for the Suppression of Vice, special attention is given to the evils resulting from the circulation of what are termed "Boys' Papers." We cannot do better than quote the following paragraphs, which thoroughly expose the evil influence of these publications, which, by destroying respect for morality and religion, encourage grossness and vulgarity, and render boys susceptible to evils of all kinds, and to none more than to the evils which lead to the vices we have been considering:

"These papers are sold everywhere, and at a price that brings them within the reach of any child. They are stories of criminal life. The leading characters are youthful criminals who revel in the haunts of iniquity. Many of these stories are written with a vein of licentiousness throughout, debasing the mind of youth as totally as the baser sort of books and pictures. Read before the intellect is quickened, or the judgment matured sufficiently to show the harm of dwelling on these things, they educate our youth in all the odious features of crime. These publications are the offspring of some of the weekly journals, that seem to run a muck-rake through the haunts of sin, and from the police court and slums of society gather weekly the sickening details that never should be put before the eyes of adults, much less children. What is the result? The knife, the dagger, and the bludgeon, used in the

sinks of iniquity and by hardened criminals, are also found in the schoolroom, the house, and the playground of tender youth. Our court-rooms are thronged with infant criminals—with baby felons.

"The following are a few facts that have been brought to the attention of the Society:

"Our agent arrested a young man nineteen years of age, for advertising and sending through the mails, under about a dozen aliases, the most obscene matter. While searching for this vile trash in his sleeping-room at his father's house, the agent found a mass of these 'Boys' Papers' piled up in one corner. No sooner had the prisoner been discovered, than he started back, exclaiming with great force, 'There is the cause of my ruin—that has cursed me and brought me to this!'

"A young lad had been for months employed by a gentleman in Brooklyn, who had reposed all confidence in him, and showed him every kindness. After awhile he began to miss sums of money varying from ten cents to fifteen dollars. When questioned, he assumed the role of innocence, as pictured in the story when the thief is caught and accused of his crime. Then he threatened, then defied, then wept,— injured innocence, — and at last confessed (unlike the story). When asked what papers he had been reading, he named two, and said he never thought of doing wrong till he read those stories.

"A lad about sixteen years of age in Buffalo, from reading these stories, as he afterward confessed, conceived the idea of robbing his employer's safe. In accordance with the description of the story, he makes an impression of the safe key, takes the same to a lock-

to loss of flesh, general weakness, paleness of the face, black circles about the eyes, and other symptoms of exhaustion, although these causes of decline are far less frequent than the one first referred to. Sometimes the symptoms of decline are so great that the child or youth is supposed to be suffering from consumption. In such a case, a physical examination of the lungs will show no disease, but a thorough investigation will disclose the fact that the individual is a masturbator. It ought to be mentioned, however, that the practice may actually give rise to consumption, so that the disease may really exist when the habit is present, as the result of its long continuance.

3. Precocious development is another suspicious symptom. A child that has a senile look needs looking after.

4. Deficiency of development is likewise a result of the same cause. When practiced extensively, it stunts the growth in a most remarkable degree. The chest, instead of expanding, remains flat and narrow. The limbs are lank and feeble. The voice does not acquire its natural depth and fulness. Even the development of the beard at proper age is deficient. Both mind and body suffer from the devitalizing influence of the vice.

5. Unnatural languor, lassitude, and dulness, especially in the morning, should attract attention. A healthy child is naturally active and full of life and animal spirits. The traits named, especially if accompanied by vacancy of expression, may well give rise to suspicion.

6. Love of being alone is another very suspicious sign which lays the child open to grave suspicion of being addicted to this vice. A child that habitually secretes itself from observation should be carefully watched.

7. Unnatural timidity in a child that previously had natural self-possession and confidence. There are other causes of timidity, however, and it would certainly be very wrong to accuse every bashful child of being addicted to this practice.

8. An appearance of unnatural boldness is a not infrequent symptom. Some young men, knowing that inability to look a person in the eye is regarded as a suspicious symptom of the habit, assume an appearance of boldness which is quite as unnatural as the symptom which he undertakes to hide. We have sometimes been told by persons addicted to this habit that they frequently found themselves staring at people in a most disagreeable way, but seemed to be powerless to help themselves.

9. A capricious appetite in children, while sometimes the result of dyspepsia or of intestinal worms, is very frequently the result of this practice. Tobacco-using should also be mentioned as a suspicious sign. Although it is not directly the result of the practice, it is pretty certain to be accompanied by it. Depraved habits, such as the eating of clay, chalk, slate-pencils, etc., are frequently observed in these cases.

10. Roundness of shoulders, or a stooping posture in sitting, sometimes results from these causes.

11. An unnaturally stiff, wriggling gait is sometimes due to the same cause.

12. Extreme nervousness, twitching of the muscles, and lack of self-control are symptoms seen in children addicted to this practice.

13. Little boys who show a decided preference for the society of little girls need careful watching.

14. The boy who complains of pain in the back, weakness of the legs, and headache, if he has previously been a strong and healthy child, is probably addicted to bad habits.

15. Unnatural size and fulness of the superficial veins of the body, particularly of the hands, feet, and legs, are symptoms worthy of attention.

16. Wetting the bed is frequently the result of an unnatural irritability of the parts, produced by self-abuse.

17. Palpitation of the heart and irregular beating of the heart are frequently the result of this cause.

18. In older boys, pimples upon the face, especially when appearing upon the forehead as well as upon other parts of the face, are strong evidences of irritation of the sexual organs, produced by self-abuse.

19. Epileptic fits, occurring in young children who have previously been healthy, should lead to a careful investigation of the child's habits.

20. Constant coldness and moisture of the palms in young persons who are not suffering from any serious constitutional malady, frequently arise from the exhaustion produced by masturbation.

21. In boys who begin the practice some years before puberty there is generally an abnormal development of the parts. If the practice is continued some

time after puberty, the organs become relaxed and diminished in size.

22. Stains upon the underclothing, night clothing, or bedding should lead to an investigation.

Parents should carefully observe the habits of their children, and on the discovery of any of the above-named symptoms, should make a thoroughgoing investigation of the matter. Parents are very likely to be easily led to believe that *their* children, at least, are innocent. The fact is, children are very much alike, and a somewhat extensive observation has convinced us that intellectual children—those who have had good moral training, and would seem to be less likely to acquire this evil practice—are even more likely to become addicted to it than those of a lower grade of intellect, who have more robust bodies, and hence a healthier condition of the nervous system. The first class, in consequence of a more highly sensitive organism, are more excitable and more easily fascinated by the destroying vice.

Effects of Self-Abuse. — There is no doubt that the effects of this vice have been sometimes overdrawn; but while this has been the case once, the contrary has occurred many times. Numerous medical writers, observing the disposition of quacks to picture in a graphic and highly colored manner the effects of the evil practice, in their efforts to counteract the designs of mercenary charlatans, have frequently, in the opinion of the author, committed the gross error of treating the matter as one of trivial importance, denying that results of the very gravest character may follow the practice if it is long continued. It is un-

doubtedly true that some persons have been able to continue the practice for many years, apparently without very grave results; but while this has sometimes been the case, it has many times occurred that persons who had practiced the habit for a much less period of time, were afflicted by results most deplorable in character. The same may be said of many other evil practices. Some men are able to practice the habit with apparent impunity for many years; while others are rapidly destroyed by it. This being the case, and as it cannot be determined beforehand whether the results will be great or small, speedy or remote, it is evident that the worst results which are observed in any case may make their appearance in any other case, and hence may be fairly presented as a picture of the possible results of the practice, and employed as an influence to prevent boys and young men from engaging in it, or to lead them to discontinue it, when the practice has already been acquired.

This evil practice, as already intimated, exercises its baneful influence upon both body and mind. The human being who gives himself up to this sort of sinful indulgence and abandons himself to the gratification of beastly lusts by this means, is likely to become, *sooner or later,* a complete wreck physically, mentally, and morally. Let us observe:

The Physical Effects of Self-Abuse. — As elsewhere remarked, the nervous excitement attending exercise of the sexual organs is the most exciting of any to which the body is subject. Under normal conditions, no excitement of this kind occurs until the body is fully matured, and the system has acquired

its highest degree of strength and vigor. In childhood, the vital powers are wholly occupied with developing and building up the body. Any drain of this sort is consequently peculiarly harmful at this period of life. The natural processes of growth, though at first abnormally hastened in certain directions, are ultimately checked. The body never attains full development when this habit is begun at an early age, and indulged after sexual development. All the vital powers are weakened.

Undoubtedly the indulgence of this vile practice affords an ample explanation for the great number of puny, scrawny, weak-backed, lank-limbed, hollow-eyed, pale, sallow-faced boys who may always be seen upon the streets of any city. But a small proportion of the young men of the present day possess one-half the vitality and stamina which properly belong to their age of life. Their vitality has been wasted and sapped by this monster of vice which has become so well-nigh universal among the youth of civilized lands.

Weakness of the back, feebleness of the muscles, loss of appetite, slow digestion or dyspepsia, nervousness, impairment of vision, loss of energy,—these are but a few of the physical consequences of this horrible practice.

Long and frequent indulgence of this disgusting habit often brings on a general decline. The patient loses flesh, grows pale and weak, begins to cough, and almost before he is aware that danger is threatened, finds himself a victim of that hopeless malady, consumption. We might mention a number of sad instances in which we have seen young men whose phys-

ical inheritance was good, go down to an early consumptive's grave, as the result of these hidden but potent causes. Fortunately, if the disease is discovered early enough, and an entire reform is made, the chances for the recovery of the patient are favorable; but, unfortunately, the discovery is not usually made until too late; or when made, the patient's will and resolution have been weakened to such an extent that the habit still continues, at least at intervals, although frequent efforts may be made to escape from the thraldom of the horrible vice. Sometimes the patient reforms only to begin the practice again as soon as the symptoms of returning health remove the prospect of a speedy death.

Epilepsy.—This horrible disease, when occurring in boys or young men who have previously been healthy, is very frequently the result of this pernicious practice. Of all forms of nervous disease, none are more appalling in their aspect, and few more dreadful in ultimate results, than this. The patient is liable to be seized any moment with a horrible convulsion, by which he will be thrown to the ground, while every muscle jerks and twitches as though under the influence of a powerful electrical current, while the face is distorted by the most frightful grimaces. Strange guttural sounds are produced in the throat, while froth and blood issue from the mouth. One of these dreadful fits may seize upon an individual while crossing a bridge or while standing upon some elevated place, from which he may be thrown down, and thus killed, or maimed for life. A poor fellow who was under the author's care a few years ago, was thus thrown from

a window in an upper story upon a stone pavement below, and sustained injuries which crippled him for life. Every limb was broken, and the body was horribly bruised in every part.

The practice of self-abuse is particularly prone to produce epilepsy, as venereal excitement itself partakes very much of the character of an epileptic convulsion, the state of the nervous system at the moment of greatest excitement being almost identical with that during an epileptic fit, only in less degree. It is not strange, then, that such a powerful excitement, frequently repeated, and particularly in immature individuals, should ultimately result in the production of this grave and sometimes incurable disorder.

As to the curability of epilepsy from this cause, we are glad to be able to say that when due to excesses, if the cause is removed, the disease is, in the majority of instances, readily curable, though of course it can hardly be expected that an individual can be restored to that absolute perfection of health which might have existed if the injury to brain and nerves had never been inflicted.

Disease of the Heart.—A number of cases of disease of the heart have come under the author's care, which were attributable to these causes. The patients were young men suffering with what had been pronounced by some physicians organic disease of the heart; but a careful physical examination failed to show the characteristic evidences of this disorder, and a search into the habits of these individuals revealed in each case the fact that this vice had been practiced, and on the discontinuance of the habit, together with

the application of the proper measures of treatment, a good recovery was effected.

Sexual Debility.—The victim of this practice pays the penalty for his excesses in ultimate loss of the power to continue his indulgence. By an immutable law of nature, we are ultimately deprived of any faculty which is grossly abused. So with the sexual function. Excesses in childhood or youth will certainly result in debility and ultimate impotency, or total loss of sexual power, in advanced age. A long train of sexual disorders and diseases arises from these indulgences, which the limits of our space here do not allow us to present in detail, but which we shall consider elsewhere in this work. Premature or excessive indulgence of any faculty results in its early impairment and extinction, and in no instance is this law of nature more rigorously enforced than in the case of the sexual function.

Sexual Neurasthenia.—Neurasthenia, or general nervous debility, is one of the most prevalent of all nervous disorders. A peculiar form of the disease, which may be properly termed *sexual* neurasthenia, is one of the most conspicuous features of the results of masturbation. One of the curious features of this malady is the great number of symptoms to which it may give rise. The expression of the disease may be through almost any organ or system of organs in the body. In one case, the head symptoms seem to be most prominent. The patient consults a traveling doctor, who tells him he is suffering from hyperemia or anemia of the brain, which means too much or too little blood in the brain. Another one attributes all

of his symptoms to malaria. Still another talks about softening of the brain. Another suggests rheumatism; another, disease of the bladder; another, paralysis; another, disease of the spine.

The suffering which a person may undergo when afflicted with this malady, is certainly such as no person in his right mind would bring upon himself; and these cases should be a warning to those who have not yet accomplished their utter ruin by addiction to this vice.

Mental and Moral Effects.—The most conspicuous mental effects observed in the victims of this vice are confusion of thought and dulness of mind. The patient, if a student, complains that he cannot learn his lessons as readily as formerly. He cannot concentrate his mind so as to do efficient mental work. He will spend many hours in the effort to perform a task which formerly could be dispatched in a very short time. There seems to be a cloud upon the intellect which is sometimes lifted for a brief interval, but again settles down upon the poor victim's brain, and shuts out from him that mental clearness and acumen which he had formerly possessed.

Another very constant mental symptom is loss of memory, especially of names and of recent events. The patient's mind has become so debilitated, his nerve tone so lowered, that the impressions made upon his brain are evanescent and very easily effaced, so that current events which come to his notice pass out of mind almost as quickly as observed.

After a time, the judgment becomes seriously impaired, and the individual is unfitted to bear the bur-

dens and responsibilities of life. Fickleness of mind renders it impossible to maintain fixed ideas or opinions any great length of time. Even the sense of propriety is lost. The individual becomes erratic, often irritable, a burden to himself, and an annoyance to his friends, who, if not utterly estranged from him by his perversities and strangeness of demeanor, apologetically regard him as a "crank." There are thousands of these poor creatures who stumble through life in the most unhappy manner possible, with intellect so impaired, with judgment so perverted, that they really live upon the very border line which separates the sane from the insane, and which entitles them to the significant name coined for the purpose of designating them, by an eminent Eastern specialist, who terms this class of persons "border-liners."

Insanity.—The victims of this vice crowd the insane asylums in every civilized land, and are the most hopeless, unhappy, degraded victims of this terrible malady. One of the curious features of these classes is that the patient, especially at the beginning of the disease, is particularly exercised upon religious subjects. In a number of cases which have come under the professional care of the author, this feature has been very marked. Perhaps we cannot do better in dealing with this part of our subject than to quote the following excellent description of insanity, when produced by these causes, by Dr. Richy, an English author:

General Symptoms.—"On entering an asylum for the insane, especially if it be one receiving patients from the middle as well as from the lower class of

society, there is one group of inmates which may arrest the attention of the visitor from the contrast presented to the excited persons around him on the one hand, and to those who are convalescent on the other. Engaged in no social diversion, the patients of this group live alone in the midst of many. In their exercise, they choose the quietest and most unfrequented parts of the airing-grounds. They join in no social conversations, nor enter with others into any amusement. They walk alone or sit alone. If engaged in reading, they talk not to others of what they may read; their desire apparently is, in the midst of numbers, to be in solitude. They seek no social joys, nor is the wish for fellowship evinced.

"The pale complexion, the emaciated form, the slouching gait, the clammy palm, the glassy or leaden eye, and the averted gaze, indicate the lunatic victim to this vice.

"Apathy, loss of memory, abeyance of concentrative power and manifestation of mind generally, combined with loss of self-reliance, and indisposition for or repulsiveness to action, irritability of temper, and incoherence of language, are the most characteristic mental phenomena of chronic dementia resulting from masturbation in young men.

"As in diseases of an exhaustive nature, we find that the cutaneous secretion is poured forth abundantly, so in the cases occupying our attention, the perspiration breaks forth on the slightest exertion. This relaxed condition of the perspiratory system is especially marked in the palms, and the exception is to find these dry in the masturbator; for, generally,

a damp or cold, clammy perspiration is constantly present, and makes it particularly disagreeable to take the hand of one of these persons. The sub-integumentary layer is but sparingly supplied with fat, which is remarkable, considering the little exercise these patients, if left to their own guidance, would take.

"To conclude this description, it is only necessary to add that the gait is slovenly or slouching, that the gaze is downcast or averted, and when addressed, the masturbator does not look the speaker openly in the face while he replies, but looks to the ground or beyond the questioner."

The ultimate result of mental disease from this cause is dementia. The mental powers gradually weaken, if the habit is continued, until the brain structure becomes so seriously impaired that the individual is reduced to the level of the brute. Almost the last ray of intelligence is extinguished, and indeed in some respects the victim of this mind-destroying vice in the last stages of his existence may become reduced even below the level of the brute creation. The patient becomes a mere animal, who eats, sleeps, and breathes, but is utterly deprived of all human characteristics, with the exception of an outward semblance. He is conscious of neither joy nor grief, pleasure nor pain. He takes his food and drink mechanically. He sits staring vacantly into space, with an open, drooling mouth, and a senseless, idiotic smile upon his face. If not closely cared for by an attendant, he defiles himself with the evacuations of the bowels and bladder, and becomes filthy and unwholesome beyond description. Most horrible indeed is the spectacle of a human being

in ruins, brought down to this most unspeakable degradation by his own vile practices.

A Victim's Picture of Himself.—Jean Jacques Rosseau, one of the most distinguished of French writers, but a victim of this most degrading of vices, wrote a confession to his son, and the following account of its consequences:

"One might say that my heart and my mind do not belong to the same person. My feelings, quicker than lightning, fill my soul; but instead of illuminating, they burn and dazzle me. I feel everything; I see nothing. I am excited, but stupid; I cannot think except in cold blood. The wonderful thing is that I have sound enough tact, penetration, even *finesse,* if people will wait for me. I make excellent impromptus at leisure; but at the moment, I have nothing ready to say or do. I should converse brilliantly by post, as they say the Spaniards play at chess. When I read of a duke of Savoy who turned back after starting on his journey to say, 'In your teeth, you Paris shopkeeper!' I said, 'That is like me!'

"I find the same sluggishness of thinking, joined with the same vividness of feeling, not only in conversation, but even while I work. My ideas arrange themselves in my brain with incredible difficulty; they circulate there dully, fermenting so as to excite me, heat me, give me palpitations; while in the midst of all this emotion, I see nothing clearly; I could not write a single word—I must wait. Insensibly this great turmoil calms down, the chaos disentangles itself, each idea puts itself in its own place, but slowly and after long, confused agitation. Have you ever seen the opera

in Italy? While the scenes are being changed, there is a disagreeable and prolonged disorder in these great theaters; all the decorations are mixed up; you see pulling and hauling everywhere, which is positively annoying; everything seems on the point of tumbling down; however, little by little, all gets arranged; nothing is wanting, and the spectator is astonished at seeing an exquisite scene follow the long tumult. Almost the same proceeding goes on in my brain when I want to write. Could I have waited, and rendered them in all their beauty the images thus painted there, few authors would have surpassed me.

"Hence arises the extreme difficulty I find in writing. My MSS., scratched, blotted, mixed up, undecipherable, attest the labor they have cost me. There is not one of them I have not had to transcribe four or five times before sending it to press. I have never been able to do anything pen in hand, with a table and my paper before me. It is out walking among the rocks and woods; at night in bed, while lying awake, that I write in my brain; it may be imagined with what slowness, especially for a man absolutely without verbal memory, and who has never in all his life been able to learn six lines by heart. There are some of my sentences that I have turned and returned during five or six nights in my bed before they were in a state to be put on paper. Hence I succeed better in works that require labor than in those which require a certain degree of readiness, like letters,—a kind of composition of which I have never been able to catch the proper tone, and the effort at which is misery to me. I never write a letter on the smallest subject

that does not cost me hours of fatigue, or if I want to write at once what occurs to me, I can neither begin nor end; my letter is a long or confused verbiage, hardly to be understood when read.

"But not only is it a labor to me to express, but also to receive ideas. I have studied men, and I think I am a tolerably good observer; yet I can see nothing of what I do see. I can hardly say that I see anything except what I recall. I have no power of mind but in my recollection. Of all that is said, of all that is done, of all that passes in my presence, I feel nothing, I appreciate nothing. The external sign is all that strikes me. But after awhile, it all comes back to me. I remember the place, the time, the tone, the gesture, the circumstance—nothing escapes me. Then, from what has been done or said, I discover what was thought, and I am rarely deceived.

"If I am so little master of my mind while alone, it may be conceived where I must be in conversation, where to speak *a propos,* one must think at the same time and at a moment's notice of a thousand things. The mere idea of so many proprieties, of which I am sure to forget at least one, is enough to intimidate me. I do not even understand how a person can dare to speak in company; for at each word one ought to pass in review every one that is present, to be acquainted with all their characters and know their histories, in order to be sure to say nothing that may offend any. Certainly, those who live in the world have a great advantage here; knowing better what *not* to say, they are surer of what they do say; yet even from them slips many an unfortunate speech.

Imagine the condition of a man who falls into it all from the clouds; he can hardly talk with impunity for a minute. In *tete a tete* there is another disagreeable, which I find worse. I mean the necessity of talking constantly; if spoken to, you must answer, and if nothing is said, you must take up the conversation. This unendurable constraint alone would have disgusted me with society. I find no burden more intolerable than the obligation to speak at once and constantly. I do not know if this arises from my mortal aversion to all subjection; but it is quite enough to be obliged to speak to make me infallibly say something foolish.

"What is more fatal is that, instead of knowing how to hold my tongue when I have nothing to say, it is just then that, to pay my debt as quickly as possible, I have a mania for talking. I try in a hurry to stammer, promptly, words without ideas, only too happy if they mean nothing at all. In trying to conquer or hide my inaptitude, I seldom fail to display it.

"I believe this is the real explanation why, though I am not a fool, I have often passed for one, even with persons capable of judging; all the more unhappy because my physiognomy and my eyes promise something better, and my failure makes my stupidity all the more shocking to others. This detail, which a particular instance has suggested, will not be useless to any one who follows it. It contains the key of many extraordinary performances of mine, which have been attributed to an untamed humor which I do not possess. I should relish society as well as any one, if I were not sure to exhibit myself, I do not say only to disadvantage, but as something quite different from

what I am. The system I have adopted of retirement and writing, precisely suits me. No one would ever have known, from my presence, what I was worth; no one would ever have suspected it."

No more accurate description of the mental condition of these sufferers could be drawn than the above. We have seen scores of these cases who would indorse the description as being in many particulars applicable to themselves. The reader will readily see in the manner in which this learned victim describes his case, in the horrible frankness with which he analyzes his character, the strongest possible evidence of the influence of this terrible vice in destroying the finer sensibilities, that delicate sense of propriety, that high regard for purity, which undepraved human beings possess.

The Remedy.—Prevention is greatly to be preferred to cure. Prevention saves suffering, shame, mortification, and despair. Cure too often means simply a mitigation of ills, the major part of which must be borne. How many times has a poor victim of this vice said to us, with tears streaming from his eyes, and dark despair written upon every lineament of his face, "Oh, why was I not warned of the terrible suffering I must endure? Why was I not told of the horrible wickedness of this filthy vice?" No tongue can describe the mental anguish, the despair, the shame of one of these victims, who, after years of transgression, is suddenly awakened to a realization of his folly, when he discovers the ruin he has wrought. Never to have been born would be far better than this living death.

If the habit has been formed, how may the victim be rescued from its thraldom? The great obstacle in the way of the recovery of these unhappy creatures is the fact that the individual's will is weakened; his conscience is blunted; his passions have grown with gratification until they have asserted complete mastery over mind and body. In addition to this, physical conditions have been established which, at a superficial glance, seem to justify the habit in a small degree, so clamorous are the demands for gratification. This, however, is but the result of the long continuance of the practice, and no more justifies it than the physical craving of the drunkard for his dram, and the immediate relief which follows the gratification of his appetite, is a justification of his intemperance.

The first thing to be done is to arouse, if possible, the patient's moral sensibilities. To accomplish this, it is proper to employ every sentiment possible. Moral obligation, love of purity, self-respect, pride, even fear, may all be appealed to for the purpose of arousing the person to such an effort as will result in his rescue. Too often the result is that the individual, though he may readily acquiesce in all that is said to him respecting the error of his ways, and may earnestly long to escape from the misery of his vice, has lost his power to resist temptation through the weakened state of the will and the constant yielding to desire. Temptation will come, and the poor fellow, who an hour before solemnly pledged himself to abandon his vicious practices, and perhaps on bended knees confessed his sins and prayed for Divine assistance, falls an easy prey to the tempter. No sooner is the act committed than

remorse, shame, despair, seize upon him, and plunge him into the very depths of wretchedness. Thus his life becomes a constant oscillation between resolve and failure, courage and despair.

Happy indeed is the repenting victim of this debasing vice who has the good fortune to possess some true and faithful friend who will aid him in fortifying his resolutions, who will rally his courage when repeated failure plunges him into hopeless despair.

Let him who will reform, resolve to succeed or die, and he may be sure that success will materially diminish the prospects of dissolution. Let him determine that no temptation, no subterfuge, no sophistry, shall again seduce him from the path of purity.

The following suggestions we have often given to those who are engaged in this struggle for liberty, and when faithfully followed, the result has been success:

Mental Purity.— The mind rules the body. Every involuntary function is the result of mind action. The brain furnishes the impulse which sets in motion and maintains in action all the vital functions. The ancient proverb, "As a man thinketh in his heart, so is he," is most emphatically verified by this class of transgressors; hence the importance of maintaining purity of mind. The thoughts must be thoroughly cleansed from every hint or suggestion of uncleanness. The person who is impure in mind will soon be impure in actions. The mind which is filled with filthy imaginations will be utterly unable to withstand the tornado of desires which his own mental debauchery will bring upon him. Let him resist the first suggestion of las-

civious thought. Let him shun mental uncleanness as he would the leprosy or a venomous serpent. Let him cultivate purity of mind, chastity of thought, and abhorrence of vileness and impurity. Thus will his resolution be strengthened, and his power of resistance fortified. Thus, too, will he succeed in repressing those physical incitements to sin which are the result of long yielding to the tempter.

Mental Occupation.—The nursery rhyme which certainly involves a great truth, "Satan finds some mischief still for idle hands to do," might well be parodied, Satan finds some vileness still, the empty mind to fill. The unoccupied mind very readily becomes a prey to unclean thoughts, especially when the imagination has for a time been allowed to run riot in sensuality. Such a mind, when left unoccupied, runs into uncleanness as readily as a duck takes to water, or a frog to a slimy pool. Complete and constant mental occupation is the only safeguard. It is far easier to keep out unclean thoughts than to get them out when they have once occupied the mind. Keep the mind full of pure, wholesome, elevating thoughts, and there is no room for anything of a low, vulgar, or filthy nature.

After long indulgence, the mind comes to dwell upon vile things involuntarily. The brain is so modified by habit that it runs readily into the channel of concupiscence. By constant, persistent effort, this basis for unclean thought may be eradicated, and the mind restored, in a measure at least, to its original purity. By constant cultivation of pure thoughts, the mind

learns to run naturally and easily in the channel of purity.

But this result cannot be accomplished in a day, nor in a month. Sometimes years, even, are required to efface the scars and blemishes made upon the mind by years of indulgence in impurity.

A Valuable Hint.—Young man, are you thoroughly in earnest about this matter? Do you thoroughly detest the sight and thought of uncleanness? Are you thoroughly anxious to wash out from your brain the dirt and filth which years of wrongdoing have deposited there? In the midst of your struggle, do evil thoughts come into your brain, and take possession of you against your will? Do you earnestly long to free yourself from the shackles of mental sensuality? Here is a suggestion for you: Write down upon a card half a dozen words which represent the purest and noblest thoughts and experiences of your whole life, such words as will call up some engrossing theme which will be certain to attract and hold the attention of the mind. Now, when an evil thought comes, either in mind or in act, bring out your card. Seize upon a word, and resolutely set your mind to work upon it. Do not give the tempter the slightest foothold. Grapple with him at the very threshold of your mind, and keep the mind occupied until the deceiver has passed by.

Good Associations.—Among the greatest of helps to mental purity and chaste occupation of the mind are good and profitable associations. One who is trying to win himself from evil thoughts and evil ways should sedulously avoid those whose conduct or con-

versation incline in that direction. Let him seek the association of the good, the pure, the noble, those whose example it will be safe for him to emulate. Let him on no account allow himself, even on a single occasion, to associate with the vile, the obscene, the licentious, those whose influence will be calculated to lead him in a downward direction.

Diet.—The influence of diet in stimulating the passions, we have already mentioned. To a person struggling to repress evil desires, simplicity in diet and the avoidance of exciting and stimulating foods is of the greatest consequence. Such condiments as mustard, pepper, pepper-sauce, vinegar, and Worcestershire sauce should be wholly discarded. Flesh food should be taken very sparingly. The diet should consist chiefly of fruits, grains, vegetables, and milk. Overeating should be carefully avoided, as it produces a plethoric condition of the portal circulation, causing congestion of the genitals, and fills the blood with crude and undigested materials which excite and irritate the passions through irritating the nerve centers. Starvation is one of the very best means of combating lust, and the man who finds himself well-nigh overwhelmed by temptation, whose passions have so long had the ascendency that he has become an abject slave, without will-power or resistance, should consider whether he cannot better, for a brief period, reduce his bill of fare to the very lowest point above starvation, and conquer, rather than suffer defeat in his conflict with the beast that rules him.

Ices, confectionery, and pastries of all kinds should be sedulously avoided. If alcoholic drinks of any sort

or tobacco in any form have been indulged, they must be wholly abandoned. We say wholly, because we have sometimes known persons to imagine that partial abstinence would answer equally well. But this is not the case. When stimulants or narcotics of any sort have been indulged, the continuance of their use, even in small quantities, continues the mischief by keeping alive the old flame, and preventing that utter extinction of the depraved appetite which occurs only when the last atom of the poison is eliminated from the body, and the tissues have returned to their normal condition. Even tea and coffee, at least if taken strong or in any considerable quantity, exercise an undoubted influence in the same direction as other narcotics and stimulants, though in a less degree. Better discard them altogether, and substitute hot water, or better still, hot milk.

Exercise.—Proper exercise is all-important for one engaged in the struggle to suppress the passions. Muscular work draws the blood away from the excited nerve centers, calms the passions, and inclines the individual to repose and rest rather than to indulgence in vice. By exercise, we do not mean a few minutes' swinging of Indian clubs or playing with dumb-bells, or five minutes' exercise on a lifting machine, or a leisurely stroll along Broadway, or an occasional excursion into the country, or now and then a day's hunting or fishing; we mean actual work, hard, muscular exercise taken daily to the amount of real fatigue. For information respecting how exercise should be taken and the proper amount to be taken in a single

day, the reader is referred to the chapter in this work devoted to that subject.

Sleep.—While too much sleep undoubtedly conduces to habits of luxury and stimulation of the passions, a proper amount of sleep has the opposite effect of quieting the exhausted and irritable nerve centers, and securing that condition of health which is best conducive to strength of mind and will, as well as of body. Go early to rest, and rise early in the morning. Avoid dozing after waking up in the morning. A second nap is rarely beneficial, but is often harmful, and the condition of half sleep and half wakefulness into which a person is likely to drop after waking from sound sleep, is one in which the mind is likely to run riot in forbidden channels.

Let us say one word about day-dreaming, a practice into which unoccupied young people are very apt to fall. We consider it to be in the highest degree pernicious. These listless reveries are apt to be prurient and sensual in the extreme; and for one who is struggling against impurity of thought and life, they are positively dangerous. The mind is in a peculiarly receptive state; the will is dormant; evil finds a ready foothold, and speedily develops into all degrees of filthiness. If tempted to drop into one of these stupid moods, arouse instantly your latent energies, and engage in some kind of physical or mental activity that will effectually dissipate the unprofitable inclination.

Daily Bathing.—The practice of daily bathing is in the highest degree conducive to both physical and mental purity. Immediately on rising in the morning,

take a sponge or towel bath, occupying one or two minutes, and rub dry with a coarse towel. The vigorous glow of the skin which follows a cool bath taken in this way has a most happy effect upon the body and mind. Tepid water may be used at first, if the person has been unaccustomed to bathing, but should be gradually lowered in temperature until quite a cool bath may be thoroughly enjoyed.

Care of the Bowels.—A constipated condition of the bowels produces congestion of the genitals and an unnatural excitability, which may react upon the mind in such a way as to produce a powerful incitement to vice; therefore the bowels should be kept regular by the employment of such means as may be required. The large use of fruit in diet; the employment of coarse grain preparations, such as cracked wheat, oatmeal, etc.; the use of graham instead of fine-flour bread,—all these things conduce to a proper regularity of the bowels. The bowels should move every day soon after breakfast. If movement cannot be obtained in any other way, an enema should be taken, although the use of the enema as a habit should be avoided. When a great amount of irritability exists, a cool enema will be found to have a remarkably efficient effect in quieting the abnormal excitement. Hemorrhoids, or piles, rectal irritation, and especially intestinal worms, act reflexly upon the genital organs, producing abnormal excitement, and when present, should receive such attention as will secure their removal.

Phimosis.—As previously remarked, a tight or long prepuce may produce abnormal irritability of the

parts by retaining the natural secretions, or producing an abnormal amount of secretion. This cause alone has undoubtedly often led to the practice of self-abuse, and, if present, would add greatly to the difficulty of overcoming the vice. Such a condition requires a surgical operation, which should be performed by a competent surgeon.

The most scrupulous attention should be given to local cleanliness, and careful avoidance of any physical or mental cause of excitement or irritation.

Religion.—We must not fail to remind the reader that the most potent of all aids, to one who is really penitent for past sins, and is thoroughly in earnest in the effort of reform, is to be found in the helps afforded by genuine religion. Prayer offers a ready means by which the weak victim of evil habits may reinforce his wavering resolutions, and scatter from his mind the evil images which allure him to sin. The divine aid thus obtainable may make the weakest strong, and may enable the most helpless and despairing wretch to rise triumphant over his besetting sin. No one, however firm in purpose, and however strong in will, can well afford to neglect this never-failing means of grace and strength.

To Cure the Practice in Children.—When the parents of a boy discover that he is addicted to the practice, they should bring to bear upon him the strongest moral suasion possible, and should watch him closely. If not successful by these means, they should, if necessary, administer proper punishments. If still unsuccessful, means should be taken to render the practice impossible. In many cases in which the tight or

long prepuce requires an operation, this may be sufficient to interrupt the practice. In young children, especially, the practice, if interrupted for a few weeks, may be broken. The application of a blister, so as to render the parts tender and sensitive, is a method applicable to some cases. A method which is wholly successful, though productive of some pain, is the following:

Draw the prepuce down beyond the glans, passing a silver wire through the skin on either side, and twist the ends together in such a way as to draw the two sides of the prepuce so close together that it cannot be drawn back from the glans. This, in exceptional cases in which the prepuce is unusually long, will effectually prevent erection, and consequently interrupt the habit. This method, for which we are indebted to Dr. Archibald, Superintendent of the Iowa Asylum for Feeble-Minded Children, we have employed in a number of cases with entire success. The pain produced by it is not great, and is in most cases an advantage rather than an objection, as it has a decided tendency to diminish the desire to continue the practice.

SOCIAL VICE.

Illicit intercourse of the sexes is certainly entitled to the second place in the list of sexual sins which we are considering in this chapter. The evils which arise from the social vice are not only numerous, but appalling in character, whether they are considered from a physical or a moral standpoint. Among the ancient Greeks, the practice of this vice was practically

ignored, and courtesans were even held in high social esteem, sometimes attaining to positions of honor in the state. Their position was really in some respects above that of honest women; and they were in no way regarded as worthy of reproach or dishonor. During the Middle Ages, gross immoralities prevailed among all classes, not excluding the celibate clergy. A large share of the convents were little better than brothels. Courtiers and kings joined hand to hand in voluptuousness, and even popes scandalized the religious world by the number of their illegitimate children.

At the present day, crimes of this character are less openly committed, perhaps, than during any previous time in the world's history; but that there is really a less degree of vice of this sort is a question which might bear considerable investigation. From what opportunities we have had for investigating this subject, which have not been few, we are inclined to think that the principles of purity and chastity are less regarded at the present day than a generation ago, although perhaps the state of things in this regard may not be so bad as has sometimes existed in ancient times in various parts of the Old World, or even in periods not far remote from the present.

While traveling in Europe a few years ago, we took some pains to make inquiries of reliable persons as to the state of public morals, and were satisfied that in many of the larger cities, at least, virtue is less highly prized, and vice is looked upon with less abhorrence than it was a generation ago.

Causes of Decline of Purity.—If we inquire for the cause of this decline of purity in morals, we shall

find it to be varied. First, and most important of all, we would suggest that the increase of vice must be due to the general lowering of moral tone among the people, and particularly among the members of the rising generation. It must be evident to every observing man or woman that conscientiousness, love of truth, righteousness, spirituality, and, in short, all religious principles, have a less active influence upon the lives of the youth of the present day than upon those of their predecessors. The growing prevalence of skepticism, propagated by profane scoffers of the Ingersoll type, and encouraged by a certain class of scientists who array their notions respecting the teachings of nature against the Bible and religion, has a marked tendency to weaken the general religious faith of the people, and lessen the influence of moral precepts upon human conduct.

The familiarity with vice in its grossest forms, which arises from the freedom with which the newspapers of the day deal with crimes of this sort, with little or no attempt at delicacy of expression, and usually dwelling with unnecessary particularity upon the details of the crime, has a decided tendency in this direction. Prurient novels and other sensational literature, whose name is legion, are also justly chargeable with a large share of the retrograde which has taken place in this direction.

One of the most conspicuous examples of this lowered moral tone as relates to matters pertaining to the relations of the sexes, is to be seen in the loss of that modest reserve in their deportment toward each other which characterized the boys and girls and young

men and women of a generation ago. It has become fashionable for young ladies to appear bold and "pert" in their manner toward young men, and the latter are certainly not the least behind the other sex in lack of modesty and reserve in their behavior. When it is remembered that modesty and proper reserve in manner are among the most effective safeguards of virtue, it will be readily seen that the marked declension in manners, which is so apparent in this particular, points very strongly indeed to a corresponding declension in morals.

Too Great Familiarity of the Sexes.—The excessive familiarity of the young of both sexes in social intercourse tends in a most decided manner to break down the barriers against impurity and to prepare the way for the most flagrant violations of purity and chastity. The unrestrained liberty which parents allow their sons and daughters who have not yet attained years of maturity and discretion, the opportunities afforded by theaters, balls, fashionable parties, etc., and the other vice-favoring conditions of modern fashionable society, operate as efficiently in the corruption of morals as though the organizers of modern society had purposely arranged for the accomplishment of that very destruction of virtue and morality which we see so evidently taking place all around us at the present day.

Evil Courting Customs.—The unlimited freedom allowed the young during real or pretended courtship is certainly not conducive to improvement in the direction of social morality. We are guilty of no exaggeration when we say that we have met scores of young

persons who have gone astray from the path of virtue, and who acknowledged to us that the familiarities allowed when "keeping company" constituted the first step taken in the road which ultimately led to the commission of the grossest sins. Fathers and mothers who wish to preserve the purity of their sons and daughters should make a vigorous protest against the growing looseness of manners and unrestrained freedom of social intercourse among the sexes, whether carried on under the guise of courtship, or without the pretense of this flimsy excuse.

There was a time in the history of the world when a young man who had committed a gross crime against virtue was considered unfit to live, and was taken without the city, and pelted to death with stones. At the present time, a young man who is known to be a rake, a debauchee, and a seducer of women and girls, is made welcome to the highest circles of society, and often receives as much or even greater attention from fashionable young women, and older women, too, than those whose lives are spotless. The fact that a rake is always popular among women, even those who are not themselves guilty of overt grossness, is a reproach upon the judgment and moral sense of those women concerning whom the charge is true, but is no excuse whatever for the young man.

Nothing could be more fatal to purity of life among the young of either sex than the popular idea that the young man may sow his "wild oats" and still be a "first-rate good fellow," and worthy of positions of trust and responsibility in society; and the fact that such a notion prevails, is further evidence of the

lowered moral tone of society to which we have already referred. It will be a happy day to the cause of morality when society says to the young man who lapses from virtue, as it does to a young woman under the same circumstances, You have forfeited your right to honor and respect. You have violated one of the plainest laws of God and man. You have become a social leper, and are likely to spread vile moral contagion more potent for evil than the virus of a rattlesnake, or the contagious virus of smallpox or cholera. Hence, unless you repent and reform, and earn a right to the confidence of the good and the pure, you must be an outcast from society, subjected to a social quarantine which will effectively prevent the contamination of your fellows.

Let young women demand of young men who wish to become their husbands the same unblemished purity which is required of them, and we may hope for an improvement, at least, in the manners and morals of the youth of the rising generation.

Precocious sensuality, the customs, manners, and, in fact, most of the conditions of life in civilized society, tend to a premature development of the sexual instincts. Little boys and girls are taught to ape their elders in showing each other attentions which are only appropriate, when proper at all, in those of older years. Little boys, in their associations with those who are their superiors in years, have their minds filled with every sort of filthiness, and are early instructed in the vile, sensual trash which passes from one lad to another on the street. By this means, the boy's repugnance for grossness and impurity is speedily overcome,

and he is soon ready to embrace the first opportunity to gratify his precocious passions and his prurient curiosity.

Parents are often greatly blamable for carelessness in regard to the sleeping arrangements of their children. Little boys and girls are often allowed to sleep together until they have reached an age far beyond that at which their purity might be endangered by so doing, and in a number of cases we have traced the beginning of a life of sin to this cause. Barriers against impurity and vice cannot be placed about the little boy at too early an age. From almost the beginning of his existence, the evil demon of lust stands ready, watchfully waiting to improve the first opportunity to claim him as a victim.

Among other causes, we might enumerate all those to which attention has already been called that predispose to the habit of self-abuse, but we need not recapitulate. Let us now consider—

The Results of Social Vice.—Only an educated and experienced physician can appreciate in any adequate degree the horrible consequences to body as well as mind and soul which follow in the wake of social immorality. Upon this vice are founded the more than twenty thousand brothels which exist in this land of Christian civilization and enlightenment. In these anterooms of hell are to be found more than one hundred thousand depraved and abandoned women, who have offered up their souls and bodies upon the shrine of concupiscence. They have abandoned home, kindred, friends,—all that is most sweet and dear in life, all that is pure and noble and good, all that is

human and tender and true, and have offered themselves upon the altar of lust, human chattels to minister to man's beastliness, to gratify unhallowed passions which "war against the soul;" which sap the life blood of all human feelings and sentiments; which, unrestrained and ungoverned, would speedily convert the whole earth into one vast Sodom and Gomorrah; which brooks no restraint, and is as merciless and insatiable as the Minotaur of ancient fable. It places the cup of nectar to its victim's lips, only for the purpose of hiding the deadly venom which its sweetness covers.

One hundred thousand poor, wretched women thus become outcasts from society, despised by their sex, looked upon as more debased than the swine that wallow in the mire, or the loathsome reptiles that haunt the slimy pool, abandoning all hope of this world or the next, consigning their souls to eternal infamy, and condemning their bodies to a life of shame and misery and a death too horrible to contemplate,— all this to gratify a million beastly men, a large proportion of whom must also share the fearful end to which their consorts are hastening.

Many young men imagine that they can sow a few wild oats,—in other words, can lead for a few months or years a life of immorality,— and then reform, "turn over a new leaf," as they say, and settle down to a sober, steady, and virtuous life. Young man, do not be deceived by such sophistry. While it is possible for a few to seem to accomplish this, if you could have marshaled before you the great hosts of those who have undertaken to act upon this plan, and failed,

you would be dismayed with fear at the thought of such an undertaking. A man who has once allowed himself to become entangled in the toils of sensuality will find escape a task by no means easy. A thousand influences deter him from the reformation which he contemplated; a thousand obstacles appear in the way, none of which have previously entered into his calculations; and if he is so fortunate as to break away from the bonds of evil associations, and shake himself free from the shackles of sensual habits long fostered, his difficulties are by no means mastered. Although he may settle down to a sober life, the old passions, the old customs, the old illicit pleasure, haunt him, and allure him like the voices of sirens wooing him to destruction. In his waking thoughts and in the dreams of his sleep, the passions which have been long encouraged, stimulated, and gratified without stint, clamor for indulgence, and goad him almost to desperation. What would not such a man give to blot out from his memory the imperfections which have been indelibly fixed upon it, the sins in which he has been an active participant in haunts of vice and shame? What would he not give to rid himself of the filthy imagery with which his wanderings from the path of virtue have filled his brain?

Another thought for the candid consideration of you young men who imagine that you can sow a few wild oats and be as good as anybody: To a man who has allowed the beast of passion to grow up within his heart and rule him, who has plunged headlong into the sea of sensuous indulgence,—to such a one, common pleasures, the legitimate joys of life, are un-

speakably tame and insipid. Fill your mouth with honey. Now taste an orange or a luscious pear. Before the honey you would have called it sweet, delicious; now you say the fruit is tasteless, mawkish. So it is with our mental and moral tastes. The man who has spent the best years of his life in sensual pleasures cannot appreciate the quiet, unexciting joys of legitimate love and domestic life. The field of his heart, once covered with golden grain, has been burned over by the fires of lust, which have left it blackened and seared and scarred and blistered, and as incapable of tender sensibilities and pure sentiments and emotions, as a charred stump. The harvest is past.

We do not wish by these remarks to discourage those who earnestly long to redeem themselves from a life of sensuality from making earnest effort to reform. Doubtless those who have descended to the lowest depths may recover themselves to a great degree. Fortunately, there are many whose characters have not been wholly debased, who have not entirely abandoned themselves to vice, but have perhaps been rather the victims of adverse circumstances than of a contempt for purity and devotion to vice; to all such we would earnestly say, Manfully struggle for victory before your shipwreck is complete. By a life of penitence and earnest devotion to the work of reforming your deformed and tainted character, you may hope, in part at least, to atone for your transgressions, and in some measure reinstate your character.

MARITAL EXCESSES.

Quite a large proportion of sexual disorders in married men, and certainly a great share of the maladies peculiar to the sex occurring in married women, may be justly chargeable to excess in sexual indulgence. The prevalent notion that the marriage ceremony opens the door for unlimited gratification of the passions is a grave and mischievous error, which has led to much suffering and unhappiness, and has possibly laid the foundation for a large part of the domestic infelicity which has ultimated in estrangement of husband and wife, and perhaps in divorce.

It ought to be more generally known that the excesses committed under cover of marriage are among the most potent causes of disease in civilized communities. And yet the real cause is rarely suspected. The decline in health is attributed to overwork, confinement, unfavorable climate, or some other cause equally foreign to the real one.

A very curious feature of these cases is the extreme anxiety for the complete restoration of the sexual powers so as to permit of their continued exercise. Some time ago, one of these patients presented himself for examination and treatment, who was more than sixty years of age, and yet he was chiefly anxious for recovery to enable him to return to his sexual pleasures. His attention was invited to the fact that he had reached an age when the sexual functions should cease to be exercised, and that nature had mercifully taken away from him the power to continue his excesses, so as to give him an opportunity to live a few

years longer. Yet his anxiety to return to his follies did not diminish.

We are convinced, from extensive observations, that quite a proportion of the nervous breakdowns in men which are attributed to overwork, cases of so-called softening of the brain, etc., are due to marital excesses. A few months of absence from home, traveling among diverting scenes, with abstinence from venereal indulgence, generally effects a rapid cure in these cases, unless the organs have been so weakened by excess that the same exhausting drain continues in the form of involuntary seminal losses, as is very likely to be the case, especially in persons of a nervous temperament and feeble constitution.

Absolute Continence Wholly Consistent with Health.—The popular notion which prevails among men, and which is encouraged by the opinion of some physicians, viz., that sexual indulgence is a physiological necessity, is certainly erroneous. Physicians are very apt to imbibe many of the medical theories current among the people, especially if they possess any degree of plausibility, and we believe that those members of the profession who indorse the popular view on this subject have obtained their ideas in the manner suggested. Certain it is that there is no authority to be found for it, either in human physiology or in the analogies of animal physiology. Indeed, so far as we can learn anything from the study of lower animals, the conclusion is irresistible that the sexual function is necessary only for the propagation of the species, and not for the maintenance of the health of the individual. The capon, a castrated cock, attains greater and more

rapid development than the ordinary male fowl of the same species. The ox and the horse are familiar examples of castrated males which are in no wise injured physically by the sexual mutilation which they suffer at the hands of the veterinary surgeon.

The long lives and vast labors of many celibate monks afford ample testimony of the possibility of the enjoyment of high health by a human male without the exercise of the sexual functions. To this testimony is added the cases of such men as Newton and other bachelor scientists who have lived long and highly useful lives, though wholly continent, so far as the sexual functions were concerned.

The truth is, these organs remain in a state of inactivity, and exert little influence upon the other organs of the body until they are roused to dominance over the other vital functions by means of the stimulus of erotic thoughts. In a man whose mind is wholly free from sexual thoughts, there can be no physiological demand for sexual exercise, and there can be no suffering or injury of any sort as the result of abstinence.

In persons whose sexual organs have been unduly excited by lewd thoughts and by frequent gratification, there is formed a sort of habit, which demands exercise of the sexual organs at the accustomed periods; and if the opportunity is not afforded, unquestionably a certain degree of suffering ensues. Nevertheless, it should be distinctly understood by all persons who experience a demand of this sort that the condition is an abnormal one, and that it is to be relieved by repression of the cause, and not by gratification of

the abnormal appetite. When such a condition exists, it may be successfully antagonized, as has been shown elsewhere in this work, by abstemiousness in diet, by exercise, and especially by mental continence and self-control.

The bearing of these discoveries upon sexual hygiene is, however, very obvious and highly important. The investigations of Brown-Sequard and the subsequent investigations of Bouchard and others, have shown that the sexual glands are useful, not only as a means of race perpetuation, but for the physical well-being of the individual, through the vital stimulus exercised by them, through the influence of their peculiar secretion upon the processes of development and nutrition. In view of this fact, it is evident that, as far as the individual is concerned, physical benefit is to be looked for, not in the loss of the secretion of the sexual glands, but in its retention and appropriation. In other words, reproduction is accomplished at the sacrifice of individual interests, a law which prevails throughout the whole organic world, being, in some instances, so pronounced that the development of progeny is accomplished only through the death of one or both parents.

The influence of the sexual glands upon development has been understood from very early ages. The influence of the removal of these glands in the equine or bovine race is well known. The proudly arched neck, the graceful roundness of the trunk and limbs, the magnificent courage and vigor of the stallion, are not found in the mutilated animal. The massive head and horns, the flashing eye, the terrible majesty of the

bull, are never encountered in the castrated animal of the same species, the meek-eyed ox. The difference in size, appearance, and character which exists between the horse and the stallion, between the ox and the bull, is purely the result of the loss of the magic influence of the secretion of the sexual glands as a stimulus to development and a regulator of the nutritive processes.

The loss of the influence of the sexual glands results in the production of an effeminate man, while the removal of these glands in a young woman who has not reached the age of puberty produces a mannish woman. It appears, then, that the influence of the sexual glands is to develop, in man, manly characteristics, or those special features which contribute to make up manhood; while the sexual glands of woman produce in her those qualities and characteristics which are especially womanly.

Within the last twenty years, in dealing professionally with some ten or twelve thousand cases of men who have been, in various ways and various degrees, transgressors of the law of chastity, I have particularly noted the frequency of effeminacy in appearance as a characteristic of those cases in which habits of sexual indulgence had been begun before puberty, and practiced to a considerable extent during the developmental period, showing that the excessive loss of the activity of the sexual glands in a normally developed person produces results analogous to those which follow the extirpation of the glands.

In view of these facts, we can readily understand why the acute observation of the trainers of the Greek

athletes led them to require, as one of the conditions most essential to the development of the highest degree of physical vigor, absolute continence—not simply temperance, which is all that is expected by most trainers at the present time. The conditions of Greek society were certainly less favorable to purity and continence than are those of to-day; yet so great was the ambition of the Greek to win a prize in the Olympian games that he willingly exercised the great self-control necessary under the peculiar circumstances under which he lived. Plato, in his "Laws," makes one of his characters say, "So then they, to obtain victory in wrestling and running, thus abstained; and shall our children be unable to persevere for a far nobler victory?"—a statement approved by the apostle Paul in 1 Cor. 9:25–27, when he says, "Now they do it to obtain a corruptible crown; but we an incorruptible. . . . But I keep under my body and bring it into subjection."

The compensation sought by the Greek for the restraining of his animal propensities, was to become a stronger and more vigorous animal; and in this he was not disappointed; for Plato mentions a number of celebrated athletes, among others, Astylos and Diopompos, whose bodies were "much lustier" than others. Having practiced total continence during their training, they had much stronger and more vigorous bodies than others who had not subjected themselves to the same restraints.

The doctrine that continence is unfavorable to health, if true, supplies a very strong argument for the maintenance of a harlot class for the benefit of

soldiers and sailors, who, for the most part, cannot marry. This doctrine is indeed the stronghold of the apologists for prostitution and of the advocates of laws regulating vice. The considerations already offered seem amply sufficient to show the fallacy of this doctrine; nevertheless, I will offer a few additional items of evidence, including the testimony of a number of eminent physicians.

Dr. James Henderson, a physician in Shanghai, China, writing in refutation of the idea that continence is more difficult or dangerous in tropical countries than in temperate climates, on account of peculiar climatic conditions, says, "I have seen many suffer severely, destroying their health, happiness, and life by following the promptings of their unbridled passions. Need I say that I have never seen a man suffer from keeping himself pure?"

In the course of my own professional experience, I can truthfully say that I have never met with a single instance in which disease of any kind was present as the result of a pure or continent life. On the other hand, I have seen the most horrible results from the unlawful and unprofessional advice sometimes given by physicians to young men, suggesting unchastity as being essential for the relief of some physical weakness, though I have never met with a single case in which the slightest benefit had been derived from following such advice. My observations with reference to the character of those who give professional advice of this sort have long ago led me to the belief that, as a rule, only those who have themselves been impure to such an extent that they were bereft of their ability

to judge properly of the influence of a pure and continent life, are capable of giving such unwise and immoral advice.

Acton, an eminent London physician, declares that the claim that disease results from continence "is a device of the unchaste, a lame excuse for their own incontinence, unfounded on any physiological law." The same writer adds: "The admitted fact that continence is frequently productive of distress is often a struggle hard to be borne, still harder to be completely victorious in, is not to be at all regarded as an argument that it is an evil."

These statements are amply confirmed by common experience with animals, especially in continental Europe, where the castration of working animals is practiced only to a very small extent. The experience of many most distinguished men must also be quoted in confirmation of these statements. Among such men may be mentioned Sir Isaac Newton, Kant, Paschal, Michael Angelo, St. Augustine, and many others of the early Catholic fathers who were among the ablest and most learned men of their time, and, in fact, of all time, and who led continent lives. The majority of these men lived to a very great age, retaining to the last their wonderful mental powers.

The exorbitant demands of the sexual appetite encountered among civilized people are not the result of a normal instinct, but are due to the incitements of an abnormally stimulating diet, the seductions of prurient literature and so-called art, and the temptations of impure associations.

The relation of diet to impurity is one which is

far too little considered. Certain senses are given us to add to our pleasure, as well as for the practical, almost indispensable, use they are to us. For instance, the sense of sight is not only useful, but enables us to drink in beauty without stint, and receives no harm thereby. The same is true of music and other harmonies which may come to us through the sense of hearing. But the sense of taste was given us to distinguish between wholesome and unwholesome foods, and cannot be used for merely sensuous gratification without debasing it, and making of it a gross and harmful thing. An education which demands special enjoyment or pleasure through the sense of taste is wholly artificial; it brings us down to the animal plane, or below it, rather; for the instinct of the brute creation teaches it to eat to live.

Growing up thus, with an abnormally developed sexual appetite, it is not strange that young men very readily imbibe current notions respecting the hygienic necessity for incontinence, and that they find in their own experience an apparent evidence of the correctness of this most pernicious doctrine. It is therefore highly important that a warning voice should be raised, and with no weak or uncertain sound, against this immoral and incontinent teaching. If the young man finds a continent life extraordinarily difficult or a cause of suffering, he should be informed that the apparent necessity is purely an artificial and an abnormal one, and is either the result of a sensuous imagination or of morbid conditions which require medical treatment, and which will be certain to be aggravated rather than alleviated by the gratification of the desires. The

young man should be taught so to order his habits of life, his diet, his regimen, his exercises, that he may be enabled to maintain self-mastery. Plato calls attention to the fact that the man who reaches a high degree of physical vigor as the result of severe training finds the control of the sexual appetite a much less severe task than does the man who neglects muscular activity.

The value of a simple diet and active, muscular exercise in subduing abnormal animal propensities, the writer has proved in hundreds of cases in which his prescription has been carried out by young men seeking relief from the thraldom of clamorous desires.

Abnormal Sexual Appetite.—All men ought to understand that the excessive demands made by the sexual appetite in the average man among civilized people is due to an abnormal activity and irritability of the sexual organs. The conditions of life in civilized communities directly stimulate the sexual functions to undue prominence in the vital economy. The active muscular life of the savage, in the open air, surrounded by nature in her most chaste and unemotional aspect, is far less a sensualist than the pampered and overfed child of civilization, who goads his appetite with conserves and condiments, and inflames his passions by stimulating foods and drinks, by the perusal of prurient literature, erotic poems and scandal-laden prose, and by witnessing at theaters and operas the graphic portrayal of sexual depravity in almost every phase, tinseled over with the gloss of art, but none the less potent in arousing to the highest pitch, passions which need to be repressed and calmed. The

man who is most likely to manifest abnormal sexual appetites is not the hard-fisted son of toil, whose nerves and muscles vibrate with the thrill of health; but the frail, nervous, intellectual man, whose emotional sensitiveness renders him an easy prey to temptation in the direction of sensuality, no matter how foreign to his education and his moral instincts such a course may be, and whose lowered tone of physical and mental health weakens his will-power and self-control, and thus lessens his power of resistance to evil of any sort. The man of intellect and culture is not less sensual than the navy because he is less tempted, but because his power of resistance is greater, and because he is surrounded by greater social safeguards.

This fact explains why the social world is now and then startled by the lapse from virtue of some man distinguished for learning or piety, and one upon whom the world is accustomed to look as being of all men most free from grossness and sensuality. Some great temptation, or some weakening of the will by loss of bodily health, has made the individual a victim to vices which he abhorred, and which he might have kept at bay had not the force of circumstances been against him. Persons of a nervous temperament are far more seriously injured by sexual excess than those of an opposite temperament.

The Physiological Rule.—The question will be asked, What rule may be followed which will insure against excess? Upon this subject, medical authorities do not agree; but certain physiological facts sustain the view that the only natural rule respecting the congress of the sexes is that the act shall occur only when

reproduction is possible and desirable. A study of the lower animals reveals the fact that, in many species, reproduction occurs only at stated seasons; and it is noticeable that it is only at these times that the sexual act occurs. For example, among horses and the bovine race, the female will not allow the approaches of the male except when in heat, or when impregnation is likely to take place. The same is true with sheep. In many fowls, the testicles of the male diminish in size, and secrete no spermatozoa through the winter months, during which time no congress of the sexes occurs.

Among lower animals, the sexual desires of the female, which appear to govern the action of the male, appear only after ovulation, familiarly known in some animals as the "rutting reason." In the human female, the conclusion of the menstrual period is marked by a similar experience, which would seem to point to a similar law existing in the human species, and which would confine the act to this period, which is also the one most likely to secure fruitful results. This would limit the indulgence of the sexual act to the number of lunar months in the year.

This doctrine will undoubtedly be too hard for those who have indulged the passions without stint, and who have been accustomed to regard as legitimate any amount of indulgence within the pale of wedlock; but we offer it with the firm conviction that it has the support of science, and will well bear the test of critical investigation.

Love, not Sensuality.— Men should divest themselves of the idea that love and sensuality are in any sense identical. The purest love is that which descends

not to the lower plane of sensuous gratification. Lust buries love; the flame of carnal passion scorches and consumes the tender, Heaven-reared plantlet—pure, unselfish love. Connubial happiness may be perfect without the passionate embrace. Its purest pleasures may be thoroughly enjoyed without those grosser excitements which, while necessary for the perpetuation of the race, are not essential for either the health or the happiness of the individual. Happy indeed is the man who has so disciplined his mind and so trained his body that he is able to hold within natural and physiological bounds the promptings of his lower nature, and may at will suppress them altogether.

The writer is well enough aware that this work will be read by those who will ridicule the ideas here advanced, and seek to cast them aside as a product of ultra asceticism, which would deny all human pleasures, and require man to abjure all but the bare necessities of life; but he is assured that the experiences of which he has been made the confidant by hundreds of intelligent men and women, justify him in the belief that many will find in these paragraphs an expression of their own sentiments, and a justification of their purest aspirations. Certainly there are thousands of suffering women whose lives are made wretched by the demands of their gross husbands, and who long for deliverance from a bondage which is often worse than death, and will gladly welcome a doctrine which would teach their husbands self-control, and which insists that the bonds of wedlock, whatever legal control they may give a husband over a wife, do not give him the moral right to use her as a means of mere animal gratification

without her full concurrence. We may even go so far as to say that from a physiological as well as from a moral standpoint, a sexual congress in which the wife is an unwilling and passive participant, is no better than the act of masturbation. Indeed, as two are injured instead of one, it may be worse. This is a strong doctrine, but what can be said to refute it? The selfishness of men will induce most of them to scout it; but the great mass of intelligent women, whose intuitions are less perverted, as with them the sexual is subordinated to the maternal instinct, will receive it as a pure gospel, and long for its acceptance by those whom they love in spite of the gross and unlawful demands made upon them.

Quite extensive observation has convinced the writer that sexual excesses lay the foundation for a great share of the domestic infelicities which come to the notice of the public through the channel of the courts in divorce cases, and through the social scandals so industriously garnered by the newspapers. Banish lust from the marriage relation, and subject the passions to the severe rule of reason and physiological law, and half the trials of the married state will disappear at once. Men and women will be purer, better, and happier; children will be more loved, better bred, and better reared; and the family institution will rise to a higher plane.

When we consider the way in which children are conceived, thoughtlessly, heedlessly, and with mere animal gratification as the leading instinct, is it any marvel that so many show early in life, almost in infancy, the erotic tendency, which has been implanted

in them? and is it any wonder that the sons and daughters of parents whose passions have been unrestrained and have grown by gratification, should possess an "easy virtue," which only requires favorable circumstances to display its weakness? Unquestionably, the "libidinous blood" is as certainly transmitted by parents who in the marriage relation indulge in sexual excess, as by those who have indulged their passions in an illicit manner.

With the newly married, excess is undoubtedly the rule, and most unhappy are the consequences in many instances. Not only is the sacred rite of marriage desecrated, but often true love is extinguished, and a mutual repugnance springs up, which sows at the very threshold of the married life the seeds of domestic infelicity and ultimate estrangement and divorce, or something worse.

Sometimes the unrestrained passions of the young husband permit him to inflict upon the one whom he has pledged himself to cherish and protect, grave physical injuries from which years of skilful treatment may not recover her. Not a few examples of such brutality have come under the observation of the author. Young women who came to the altar blooming brides, enjoying hale health, free from disease, have returned from their short honey-moon pale, feeble shadows of their former selves, prepared for a life of suffering invalidism or an early decline.

Why does not society revolt at such outrages against human rights, against morality and decency? Why does not woman assert herself, and refuse to be a mere toy, a slave to man's propensities? Unfortunately,

the average woman who enters marriage, has but the faintest notion of what she is to encounter. The average mother considers it her duty to allow her daughter to grow up in utter ignorance of herself, her functions, and her rights, and takes pride in her ignorance. Tradition has spread a mystic veil over the whole subject of procreation, and the mystery is only torn away when perhaps irreparable mischief has been done, or when the discovery is too late to be of any use.

Young man, are you about to enter the holy state of marriage? Let me counsel you. Weigh first your motives. Are they pure or gross? Does love, pure and undefiled, reign in your heart, or sordid lust? Have you so complete a mastery of yourself that you can deport yourself like a man, or are your passions so dominant that they will drive you to behave yourself like a beast? If not sure of yourself, wait. Put yourself under discipline. If the beast is strong, you must fight the harder. Weary him down with hard, muscular work. Starve him out by abstemiousness. Crush him with an iron will and an inflexible purpose. Give him no quarter until he succumbs. Then you are safe, but you must watch. Keep the mind high up. Keep the spirit dominant. As Paul said, "Keep the body under." Enter thus the marriage state, and with a wife who is your equal, intellectually and morally, peace and joy unalloyed are assured to you.

Abortion.—Among the moral evils resulting from marital excesses, must be reckoned the heinous crime of criminal abortion. A woman finds herself the unwilling mother of an unborn child, the very thought of which fills her with repugnance and disgust. She

argues, Why should I be made to suffer the pains of pregnancy and childbirth merely to gratify the animal propensities of another? She transfers the sense of injustice which she rightfully feels against the author of the wrong to the helpless creature which is the natural consequence of it, and allows her feelings to grow into actual vindictiveness, when she is ready for almost any measure which will free her from the incumbrance, and willingly resorts to the use of drugs or instruments by which the purpose may be accomplished.

Fearful indeed are the consequences of this terrible crime. Often enough the mother's life is sacrificed or her health forever shattered. No one could be more wretched than the woman who has brought upon herself the physical woes resulting from this unnatural crime. The violence done the delicate tissues of the womb often sets up most terrible inflammations, the results of which can never be wholly effaced, if the sufferer does not pay the penalty for the crime with her life. Sometimes the most persistent efforts to compel the womb to give up its treasure do not succeed, although the fetus may be so mutilated that at birth the human form is scarcely recognizable. This may be fairly considered as the cause of some of those terrible monstrosities which have sometimes been attributed to some demoniac agency, and which may still be charged to motives that are certainly something less than human,— may we not say devilish?

The idea held by many that the destruction of fetal life is not a crime until after "quickening" has occurred, is a gross and mischievous error. No change

occurs in the developing human being at this period. The so-called period of "quickening" is simply the period at which the movements of the little one become sufficiently active and vigorous to attract the attention of the mother. Long before this, slight movements have been taking place, and from the very moment of conception, those processes have been in operation which result in the production of a fully developed human being from a mere jelly drop, a minute cell. As soon as this development begins, a new human being has come into existence,— in embryo, it is true, but possessed of its own individuality, with its own future, its possibilities of joy, grief, success, failure, fame, and ignominy. From this moment, it acquires the right to life, a right so sacred that in every land to violate it is to incur the penalty of death. How many murderers and murderesses have gone unpunished! None but God knows the full extent of this most heinous crime; but the Searcher of all hearts knows and remembers every one who has thus transgressed; and in the day of final reckoning, what will the verdict be? Murder?— MURDER, child-murder, the slaughter of the innocents, more cruel than Herod, more cold-blooded than the midnight assassin, more criminal than the man who slays his enemy,— the most unnatural, the most inhuman, the most revolting of all crimes against human life.

But let us not condemn alone the weak, half-crazed woman who has been compelled to become a mother against her will, simply to gratify a sensual husband. Who will lay upon her more censure than upon the man who is responsible for the first sin? He deserves

at least an equal share of condemnation. Let husbands weigh well this fact, and act accordingly.

"Marital Rights."—Several times have we been approached by husbands with complaints that their wives denied them the exercise of their "marital rights." What are a man's "marital rights"? Certainly no man has a right to treat his wife as a prostitute. The man who considers his wife as simply a means of gratifying his animal propensities, is unworthy of a wife. He is worse than a beast, or at least has less sense in this particular than most beasts, for, as a rule, a male beast will not approach a female who is not in a condition in which she desires sexual congress, and is prepared to engage in the act fruitfully. We do not hesitate to say that no man has the right to demand of his wife that she shall minister to his passions simply for his personal gratification. It is no part of a woman's marital obligations to thus minister to and encourage a depraved and artificially stimulated appetite. A woman is sovereign over her own body, married or unmarried; and no man not wholly given over to selfishness and grossness, will attempt to invade her rights for his personal gratification.

But, says the passionate husband, whose wife lives upon a higher plane of being, what shall I do?—Conquer yourself. Subdue your lustful cravings. Repress the animal by the development of the intellectual and spiritual. Fight down and trample under foot the beast that rules you. Rise into a higher sphere. Leave behind and below you the gross and sensual. Do this, and you will become a new man. You will breathe a purer and a better atmosphere. Love will no longer

mean lust and sensuality, but will become a purer passion, partaking less of sense, and more of that divinity which gave it origin.

Cheating Nature.— Numerous devices are adopted by both married and unmarried for the purpose of defeating the natural results of sexual indulgence, the nature of which it is unnecessary to notice here. It is sufficient to say that all are detrimental. Thousands of men and women are suffering to-day with curious and varied forms of nervous and other disorders, the real cause of which is simply addiction to this sexual vice. The ingenuity of man has not yet devised a means by which the immutable laws of nature can be abrogated or violated with impunity. The penalty of disease is certain to follow sooner or later, no matter what subterfuge is employed.

MENTAL VICE.

Many young men who have never been guilty of an overt act of sensuality, allow themselves to indulge in mental vice almost without restraint. The mind is permitted to dwell upon themes the most vile, to revel in all the filthiness of licentiousness. The imagination, stimulated to the highest possible degree, excites the body, and produces all the physical results of actual sensual indulgence. Indeed, the nervous excitement occasioned by this mental lasciviousness, is far more intense and exhausting than physical concupiscence. These filthy dreamers may imagine themselves pure because they do not commit overt sin; but He who knows all hearts, who reads the innermost thought as

clearly as the most open act, the All-seeing eye, beholds these mental fornications and adulteries, and writes them in the record of human character. What a fearful record this must be if every thought appears in all its monstrous hideousness. Young man, you who have abandoned yourself to mental lust, weigh carefully this thought. Would you like to have your mother look in upon your sensual mind, or know of its obscene wanderings? Would you respect your father if you knew his mind to be such a quagmire of mental filth as your own? Can you respect yourself when you reflect upon the grossness of your own thoughts, the vile imaginings to which you have given loose rein?

Know well, young man, your sin will find you out. You may profess to be a man above reproach. Perhaps you are a communicant, a member of the Y. M. C. A., and an active worker in Christian enterprises of various sorts; but this will not save you from becoming stamped with the mark of concupiscence. Your mental adulteries are not hidden, even from human eyes. An unclean mind reveals its true character in that wonderfully accurate mirror, the human face. Every thought, every changing mental state, finds silent but emphatic expression in the face. When rage, hate, envy, agitate the brain, the muscles of the face mold it so as to fit the mental state, and these awful passions stand out in bold relief. Sorrow and grief, joy and happiness, produce an equally striking picture. So also with lust. A mind filled with obscene and lustful thoughts, makes a corresponding picture upon the face. With photographic accuracy the muscles of expression portray the mental abominations within. By and by the tran-

sient expressions of the face become fixed, when the mind is allowed to dwell upon unclean things, and the face is indelibly stamped with the insignia of vice. As we mingle with young men and boys, as we pass them on the street, how many such faces do we see! How few faces portray a character unstained by lust, unsoiled by moral filth!

But the mental and moral consequences of this form of vice are by no means the only results. Those who indulge in mental lasciviousness with the idea that they may thus gratify their sensual desires without incurring the risks of physical harm which other forms of sexual excess involve, deceive themselves in vain. We have met many cases in which all the effects of prolonged addiction to self-abuse were the result of mental vice alone. Indeed, the prolonged and intense excitement occasioned by an active imagination abandoned to lust, is in certain respects more harmful, and is certainly more exhausting, than almost any other form of sexual abuse. No form of sensuality produces such speedy and complete emasculation, or loss of sexual power, as this; and no class of cases offers so little hope of recovery from the effects of transgression.

Young man, have you become a slave to a sensual mind? Are you one of those mental adulterers whose lecherous imagination compels every woman to be the victim of his lust, and hesitates not to debauch for his vile pleasure the purest and the best? who loiters about the streets, gazing with lustful eyes upon every passing female? or visits the theater, the lecture hall, even the house of God, for the purpose of discovering new victims for his foul but fickle fancy? who goes up and

down in all the walks of society for beauty which the insatiable beast of passion within him may devour? Do you belong to this horrible class of satyrs, monsters in human shape, moral assassins, cowardly, sneaking, conscienceless invaders of virtue, from whose vile embrace the purest and loveliest have no protection? If you do, let me say to you that destruction awaits you. Swift retribution will fall upon you. You shall find yourself accursed in this world and the next. The pure joys of true love, of domestic peace and bliss, you shall never taste; and at the great day, when all men are called upon to render an account of their deeds, when every hidden thought stands out in boldest characters before the Judge of all the world, then shall your mean and filthy soul be weighed, and you will be sent away with those of whom it is said, "I never knew you."

Young man, if you have taken the first step down toward this condition of mental infamy, call a halt at once in your mind-wanderings. Cease your vicious imaginings; and by constant watchfulness and prayer, endeavor to win back your unchaste mind to paths of purity and virtue.

DISEASES OF THE SEXUAL ORGANS

NEARLY all forms of sexual disease are the result of sexual vices of some sort. The sexual organs are no more likely to become disordered than are other organs of the body, unless the laws which relate to their healthful activity are in some way transgressed. It does sometimes happen, however, that diseases of other portions of the body result in disorders of the sexual functions; but those maladies which originate in this way, play a very insignificant part in the pathology of this important class of diseases.

One conspicuous feature in this class of maladies is the remarkable influence they exert upon the health of the general system, which often seems to be vastly out of proportion to the local manifestations of disease. The explanation of this fact is found in the potent influences of reflex activity. There are in the body three great centers of morbid reflex activity,—the brain, the nerve centers which preside over the digestive organs, and those which control the sexual and urinary organs. Among them all, perhaps the most powerful and far-reaching in its influence is the last-named, the genito-urinary group. The close relation of this group of nerve centers to those which control the organs of digestion, as well as to the entire

spinal cord, and through it with the brain, gives an opportunity for the widest and most varied influence to be exerted when diseased conditions set up a train of morbid processes in any part of the various organs under their immediate control.

Thus it is that diseases of the sexual organs which are seemingly of the most trifling character, sometimes produce the most profound debility of the whole system, often to such a degree, indeed, as to give rise to the opinion that some grave organic disease may be sapping the vitality of the patient.

SEXUAL NERVOUS DEBILITY.

The long list of varying symptoms which have been grouped under the head of Sexual Neurasthenia, or Sexual Nervous Debility, presents such a formidable array of morbid sensations and conditions as to almost lead to the supposition that a person in this condition is compelled to experience every possible symptom or morbid sensation to which human flesh is heir.

Symptoms.— Pains and other unpleasant sensations in the head, pressure at the back of the head, unpleasant sense of fulness in the forehead, dulness of intellect, confusion of thought, want of readiness of thought, a sort of abstraction of the mind, various morbid fears, nervous irritability, perversity of temper, fickleness of disposition, tenderness of the eyeballs, sensitiveness of the eyes to light, specks before the eyes, giddiness, roaring and other sounds in the ears, twitching of the muscles in various parts of the body, numbness of the arms, limbs, or other parts, tenderness

of the spine, backache, pains in the loins, wandering pains throughout the body, various dyspeptic symptoms, inactivity of the bowels, profuse or scanty secretion of urine, abnormal sexual irritability, or the opposite condition,—these are but a few of the symptoms which harass and render miserable the sufferer from sexual neurasthenia.

Causes.—The most common of all causes of this disease is self-abuse, begun at an early age and continued until after puberty, or acquired later and practiced to great excess. Sometimes it may arise as the result of marital excesses, although in the latter case it is generally possible to trace the first beginning of the disorder to the practice of masturbation during childhood or youth.

Treatment.—Sexual neurasthenia is an accompaniment of nearly all forms of sexual disorders, and, depending as it does upon these local disorders or morbid conditions for its cause, it requires no specific treatment other than such as may be indicated for the removal of the local disease, and such measures as will build up the general health, and restore the wasted nervous energies.

Among the most valuable means for accomplishing the last-named purpose are the following:

Proper Exercise.—Proper exercise is not only an excellent nerve tonic, but it acts in a most powerful manner as a sedative in repressing nervous irritability. Daily exercise in the open air should be taken to the extent of producing genuine fatigue. There is no better exercise than swimming for developing the body, toning the nerves, and subduing inordinate passions.

Byron, whose immoralities were at times as extraordinary as his poetic genius, was often able to maintain a strictly continent life for long periods by daily swimming for hours in the sea. The state of extreme exhaustion should never be reached, as this will weaken rather than strengthen the wasted nervous system. Various gymnastic exercises are also valuable, and should be taken in a systematic and regular manner.

For full directions respecting exercises, see the chapter devoted to that subject in a preceding portion of this work.

Diet.—A sufferer from nervous debility should give scrupulous attention to diet. This is made necessary not only by the special requirements of a weakened nervous system, but by the fact that almost invariably the digestive organs are weakened, the lowered nerve tone producing a condition of atony which may be well described as *slow* digestion. Food should be sufficient; good in quality, but moderate in quantity. Stimulating condiments of all sorts should be sedulously avoided. Tea and coffee, and all other narcotics and stimulants, particularly alcohol and tobacco in every form, should be entirely discarded. The diet should consist chiefly of fruits and grains, with an abundance of milk, and some of the better classes of vegetables. Two meals a day will be found preferable to three, provided they are taken with proper intervals between, and the avoidance of supper will be found perfectly conducive to healthful and refreshing sleep.

Sleep.— Regular and abundant sleep is essential. These persons often complain of being always tired, and particularly in the early part of the day, no mat-

ter how much sleep has been taken. This sense of exhaustion is not often real weariness, being most frequently a morbid sensation like many of the other symptoms which these sufferers experience; but it is usually a very distressing symptom, and disappears only when the patient has largely recovered his normal vigor and nerve tone. Sometimes the morning languor is due to distressing and exhausting dreams through the night, the influence of which upon the nervous system is undoubtedly almost as bad as though the individual had actually encountered the experiences through which he wanders in the mazes of dream-land.

Bathing.— The morning bath should not be with cold water, which is seldom borne well by this class of persons, but with water of a temperature a little below that of the body. This is a most excellent means of counteracting the languor and lassitude referred to, and of stimulating the vital processes in such a way as to secure an improvement in the general nutrition.

The various methods of taking baths will be found briefly described in a subsequent chapter. Hot baths are enervating in character. The bath should always be cool enough to leave the patient with a lively glow after a vigorous rubbing.

Sponging the spine with water as hot as can be borne, say 110° to 120°, is a very excellent means of relieving backache and exhaustion. Sponging alternately with hot and cold water, one-half a minute each, produces better effects than hot water alone. This treatment may be varied by sitting on the edge of a tub, and allowing the assistant to pour hot water from a dipper upon the spine. This hot pouring is one of

the most effective means of relieving backache. It should always be followed by an application of cold. This may consist of a towel wrung out of cold water and applied to the parts, and rubbed until the reddened skin is cooled; or, the reddened surface may be rubbed for one or two minutes with the hand repeatedly dipped in cold water; or, one or two dipperfuls of cold water may be poured upon the parts which should then be rubbed with the hand for a few seconds.

SPERMATORRHEA.

When used in its strictest sense, this term applies to an involuntary and unconscious escape of the seminal fluid without sexual excitement; but common usage has given to it a wider significance, and we shall include under this head those conditions in which there occur involuntary seminal losses of any sort. Spermatorrhea is not a disease of the testicles, and sometimes exists, indeed, when there is no disease of any of the genital organs. The involuntary discharges are the result of an abnormal excitability of the nerve centers which control the sexual organs. This condition usually results from the weakness and exhaustion following some form of sexual abuse. In the majority of cases, as we shall see, the leading local morbid condition is an irritability or abnormal sensibility of the urethra, particularly that portion nearest the bladder, known as the prostatic urethra. This portion of the canal is largely supplied with sensitive nerves, and surrounded with the ejaculatory muscles, by the contraction of which the seminal discharge is produced.

Varieties of Spermatorrhea.—There are three distinct varieties of this disease, which are really different stages in the morbid process which lies at the foundation of the malady. These three conditions may follow one another as the disease progresses, or they may all exist together.

The three conditions are known, respectively, as (1) Nocturnal emissions, or pollutions; (2) Diurnal emissions; (3) Spermatorrhea, or, as it has been termed, spermorrhagia. We will consider each of these maladies or morbid conditions separately:

NOCTURNAL POLLUTIONS.

Probably no form of sexual disease so often comes to the notice of the physician as this. The newspaper advertisements of quacks, and the advertising pamphlets which are scattered about the country, abound with graphic descriptions of the terrible consequences of this disease, and are the occasion of great alarm to many who are not really suffering so seriously as to demand medical attention.

Symptoms.—The usual symptoms complained of by this class, are those which have been enumerated under the head of "Sexual Nervous Debility," to which are added frequent seminal losses during sleep, either with or without lascivious dreams, and often various local symptoms, particularly a smarting or burning accompanying the passage of urine, dribbling after urination, pains in groins or the testicles, muscular twitching or dull pains in the perineum, or fork of the thighs, abnormal excitability of the parts, as indicated by fre-

quent or painful erections, or the reverse condition,—unnatural coldness or numbness of the genitals. The patient sometimes notices that the left testicle hangs a little lower than the right, which he also attributes to the disease, as he does many other symptoms which have no relation to it. This condition of the left testicle is perfectly natural, and need be no cause for alarm. Unnatural tenderness, softness, or shrinking in size of the testicles, are symptoms which are sometimes present, and which are evidences of disease.

Emissions never occur until after puberty, and generally come on after the habit of self-abuse has been abandoned, or greatly diminished in frequency. At first, they may occur only at intervals of a week or two. Gradually, the frequency is increased until they may occur every night, or even as often as four or five times in a single night, rapidly reducing the patient to a most wretched condition of physical, mental, and nervous exhaustion.

It must not be imagined, however, that a loss of this kind is in itself evidence of serious disease, although it is undoubtedly true that with a perfectly healthy and continent man, who lives a quiet and normal life, not allowing his thoughts to dwell upon such subjects as produce frequent and abnormal excitement of the genitals, involuntary pollutions would never occur; and in individuals who closely approximate the above-named conditions of life, nocturnal pollutions certainly occur with very great rarity. The question will arise, How often may such losses occur without serious impairment of health, or without being properly considered evidences of disease? To this we must

reply that there can be no absolutely positive rule established for every individual, but it may be said that if such losses do not occur more frequently than once in several weeks, and if such losses are not followed by depression or other unpleasant symptoms, the individual may be considered to be in a condition of health. At least, no remedial interference is usually demanded. There is certainly very great diversity in the ability of individuals to endure losses of this kind. In some persons, they occur as often as once or twice a week for years, without producing, apparently, any very grave results; while in others, losses occurring even much less frequently will each time be followed by extreme nervous irritability of disposition, exhaustion, backache, and the general group of symptoms present in these cases. Although in these cases there may be no apparent injury, the immunity is only apparent. A few years later the terrible, exhausting effects of these losses is realized in premature breakdown, neurasthenia, chronic indigestion, premature old age, and other evidences of constitutional impairment.

It should be noted that the unpleasant effects of nocturnal losses, though usually felt most intensely on the following day, sometimes are not observed until the second or third day afterward. There seems to be an effort on the part of the system to maintain its usual condition, which succeeds for a day or two, and then gives place to the nervous collapse from which most of the symptoms arise. In some persons, these symptoms are quite evanescent, lasting but a few hours; while in others, they last several days, and almost totally unfit him for physical or mental exercise. Fre-

quently the depression arising from this cause is so great as to produce most profound melancholy. The individual is plunged into a state of such utter wretchedness and despair that life seems to be intolerable; and when this condition is made almost constant, by the frequent repetition of the loss, it is not remarkable that the mind sometimes gives way, so that reason becomes dethroned, and the poor victim becomes an inmate of an insane asylum, or ends his sufferings by suicide.

It is a matter to be greatly regretted that most unwise advice is often given in these cases. The young man suffering in this way, on seeking medical counsel, is not infrequently met by the assurance that the difficulty is wholly in his imagination, that he has probably been reading some quackish advertisement or publication, and that all he has to do is to dismiss the matter from his mind. He is assured that the losses from which he is suffering are "perfectly natural," that it is an indication of health rather than disease, and that he need not have given himself any concern about it.

We have met scores of young men, who, through receiving such advice as the above, have been led to allow the malady to gain ground, continuing year after year without attention, until it had reduced them to great physical wretchedness, mental enfeeblement, and almost total impotence. While the advice may be entirely suitable in a certain class of cases, the wholesale manner in which it is administered to young men suffering in this way, is certainly productive of a vast amount of harm, although those offering the advice are certainly not open to the charge of dishonesty, and

degree of relief in these cases, but extensive experience in the rational treatment of hundreds of cases of this disease justifies the statement made by Acton, of London, that "the prognosis of an ordinary case is very favorable, provided the patient will honestly aid the surgeon in effecting a cure." The author is also justified by the results of his own experience in claiming for the treatment of this class of cases the most gratifying success. Indeed, there is probably no class of functional disorders which yield more readily to thorough, rational, and scientific management than does this. Of course, recent cases are much more readily controlled than those of long standing, but it is safe to say that there are few, if any, cases which cannot be greatly relieved, and the majority can be substantially cured by the adoption of the proper means.

To Control the Losses.— First, we will consider such measures as may be adopted to prevent the occurrence of the losses, and chief among these we must place mental control.

Dreams are but reflections of our waking hours. In dream-land, we live over the experiences of the day. Dreams may be said to be an echo or a shadow of our voluntary thoughts and acts; hence it becomes a matter of the gravest importance that the mind should be thoroughly purged of all unchastity. During sleep, when the will is less active, the passions which have been aroused and tantalized by ungratified excitement, will assert supremacy, and carry the individual through all degrees of sensuousness. On the other hand, when the mind is, during the waking hours, kept under thorough control and free from impure thoughts, the

dreams will be far less likely to assume a lascivious character.

Voluntary Control of Dreams.—Even during sleep, the will is not entirely dormant. If the will is energetically employed during the waking hours, instantly repressing the first suggestion of impurity, the habit of the waking hours will be maintained even during sleep, and the first suggestion of erotic ideas, even in dreams, will arouse the will to resistance. By determined and persistent effort in this direction, this practice of the will may be made so vigorous as to arouse the individual from sleep at the first suggestion of sensual ideas, and in time to prevent the occurrence of the sexual paroxysm. This is a principle of the utmost importance in the treatment of this disease, and should be thoroughly comprehended and continuously employed by one who is seeking deliverance from this disgusting disorder.

Success by this means, however, requires the most faithful and persevering effort. Resistance should be made in every instance. A single failure to exert the will restores the malady to full control, and makes it necessary for the patient to fight the entire battle over again. The only cases of this disease which are hopeless are those in which the mind has become so debased, and the will so weakened, that both body and mind have become a helpless prey to evil thoughts, and to "the passions' vengeful reign." But if the patient goes about this work in real earnest, and wages a vigorous warfare against every form of sensuality in thought or act, he may feel the utmost confidence of success.

As aids to proper medical control, it is important that the patient should cultivate such society as will encourage good and elevated thoughts. The suggestions made and the directions for the cure of self-abuse are all applicable to cases of this sort, and should be carefully read.

Diet.— At least a second place should be assigned to the influence of diet when properly regulated in controlling these losses. The patient who overeats, indulges in stimulating or exciting foods, ices, pastries, late suppers, and other dietetic digressions, is certain to suffer much more frequently in this way than he who carefully adapts his dietetic regimen to the requirements of health. The diet should be thoroughly nutritious, but unstimulating. Animal food, taken in great abundance, exerts an undoubted influence in exciting the sexual organs, and producing involuntary losses during sleep. A stimulating diet produces such a state of the nervous system as predisposes to erotic thoughts, and renders mental control much more difficult. An undoubted influence is also exerted through the urine. Animal food, in any but small quantities, especially if the patient is not habitually engaged in vigorous muscular exercise, produces a condition of the urine which is likely to excite irritability of the bladder, or to aggravate an irritable condition of the prostatic urethra already existing.

Condiments of all sorts are particularly harmful. A person who has indulged in a heavy supper, in which soup or other foods containing a considerable amount of cayenne pepper has been taken, will recollect a smarting and burning pain in the rectum the following

morning. This is due to the fact that pepper, as well as most other spices, is not soluble in the digestive fluids, a considerable portion remaining in the alimentary canal, and acting as a direct irritant to the mucous membrane of the intestines, all the way down. The irritation is felt only in the lower part of the rectum, as it is the only portion abundantly supplied with sensitive nerves. The close proximity of the ejaculatory ducts and seminal vesicles renders an irritation of this kind especially provocative of sensual desires and excitements. Hence nothing could be better calculated to bring on involuntary excitements during sleep than the use of these condiments.

Tobacco, alcoholic liquors, even tea and coffee, all act directly or indirectly, in greater or less degree, upon the sexual system, and their use should be *entirely discarded.*

Water should be liberally used as a drink for the purpose of diluting the urine, and thus preventing any irritation arising from a too concentrated condition of this secretion. If the digestion is feeble, so that cold water is slowly absorbed, water should be taken at a temperature a little above blood heat, or at about the temperature at which tea or coffee is usually taken. The best time for taking water is about one hour before eating, and half an hour before retiring at night. Six or eight glasses may be taken a day with advantage. Little fluid should be drunk at meals, and ice-water should be avoided at all times. As a substitute for tea and coffee, hot milk may be taken with advantage.

Foods abounding with fats, rich cake, preserves, pickles, and all articles difficult of digestion, should be carefully and habitually avoided. These articles produce indigestion and gastric irritation, which, acting reflexly upon the genital organs, produce local excitements that otherwise might not have occurred.

We have often known young men to relieve themselves of this unhappy condition by adopting the vegetarian diet, although this cannot be offered as a panacea or a specific for this or any other morbid condition. One who is thoroughly desirous of recovering his health, will be willing to make any sacrifice required for the accomplishment of his purpose. If health is worth anything, it is worth working for. It is worth denying the appetite and curtailing depraved tastes; and there is this to be said for the encouragement of one engaged in this struggle, that the conflict with appetite, if manfully and faithfully fought, is usually a brief one. Appetites and cravings which at first were hard to be resisted, gradually weaken under the influence of persistent control, until after a time their clamorings cease, natural tastes and instincts are restored, and the relentless rule of perverted desires and depraved tendencies closes. The consciousness of freedom which one experiences who has successfully fought this battle, is ample compensation for the mental effort and the self-denial required to win the victory.

Exercise. — The influence of vigorous muscular exercise in calming and controlling the passions, has been sufficiently dwelt upon elsewhere, and the observations made need not be repeated here. A sufficient amount

of exercise should be taken daily to produce gentle muscular fatigue, though complete exhaustion should be avoided. The quantity of exercise and how it should be taken, may be learned by reference to the chapter on this subject. The effect of muscular exercise is to distribute the blood well through the body, thus preventing local congestion, and to work off the condition of plethory and nervous erethism which are predisposing causes of the disease under consideration.

Sleep. — Attention to the conditions of sleep are of the utmost importance in the treatment of this malady. Special attention should be given (1) To the position of the body during sleep. Every sufferer from this malady is aware of the fact that these losses almost always occur while sleeping upon the back. This allows the blood to accumulate in the spinal cord, and also overheats this part of the body, thus in two ways producing abnormal excitability of the nerve centers controlling the sexual organs. Emissions are hence likely to occur when the body is in this position, when the organs have been weakened by abuse, or when local irritability exists.

It is for this same reason that nightmare occurs from sleeping upon the back, in connection with irritability of the digestive organs, arising from indigestion, or the attempt to dispose of a late or indigestible supper. The best position for sleeping is upon the side, and preferably upon the right side. This relieves the nerves at the back of the trunk from the pressure of the abdominal organs, and prevents overheating of the spine, and undue accumulation of blood about the nerve centers. Those who are restless during sleep,

often changing position without waking, may succeed in preventing themselves from getting upon the back by fastening about the waist a towel, in the center of which a knot has been tied, inclosing a small stone or other hard object. The pressure of the knot upon the spine will produce sufficient disturbance to awaken the individual from sleep, should he turn upon the back. Patients have sometimes made for themselves a harness for this purpose, which is more easily retained in position than a towel.

Various elaborate devices have been constructed for waking the patient from sleep on the occurrence of sexual excitement, among which are various forms of "rings." The success of devices of this sort depends entirely upon the promptness with which their suggestions are heeded. A person who neglects to give immediate attention to the gentle reminder offered by these devices, very soon disregards them altogether, so that they come to be of no avail. All of them are of far less value than the suggestion previously made to so charge the will with the duty of resisting these tendencies that it will be aroused to a vigorous resistance at the first suggestion of danger.

2. Avoid morning napping. Nocturnal losses almost always occur in the morning, when the sleep is less profound than in the early part of the night, and the imagination begins to become active in the production of dreams. It is very likely to occur during the second nap, if the individual, after awakening toward morning, again falls asleep, as this second sleep is very likely to be attended by dreams and half-waking reveries; hence a second nap should be sedulously

avoided. When the loss occurs at a regular hour in the morning, as is sometimes the case, it is well for the individual to provide himself with an alarm clock, which should be set half an hour before the usual time for the loss to occur, and he should promptly get up and dress himself as soon as the warning is given. Dozing in bed is simply flying in the teeth of danger, and must on no account be indulged.'

3. Fulness of the bladder or bowels is very apt to provoke an emission, and hence both should be emptied before retiring, and it is well to form the habit of awakening one's self in the middle of the night to relieve the bladder. A person who is much troubled from this cause should avoid drinking in the evening.

It is not necessary to move the bowels at night if there has been a proper evacuation in the morning after breakfast, which is the most natural time for the bowels to move; but if they have not been moved thoroughly during the day, some means should be taken to secure an evacuation at night, and if necessary, the enema may be resorted to.

4. A person suffering from nocturnal losses should avoid sleeping on feathers or on a bed which is very soft. The bed should be rather hard. A cotton, wool, or hair mattress is the best. The bed covering should be as light as is consistent with comfort. Feather pillows should also be avoided, as they tend to heat the head. A thin pillow of cotton or hair is preferable.

5. The sleeping-room should be well ventilated, and only slightly heated. A heated or poorly ventilated room is a powerfully predisposing cause of sexual excitement during sleep.

6. Before retiring at night, the patient should avoid any sort of mental exercise which will produce very great excitement or exhaustion of the brain or nerves. A half hour's walk in the open air, or, if the weather is inclement, exercise with dumb-bells or Indian clubs is an excellent preparation for sound and refreshing sleep.

Care of the Bowels.— Careful attention to the bowels is a matter of first consequence in these cases. Constipation leads to congestion of the pelvic organs, and the violent efforts required to move the bowels congest and irritate the seminal vesicles, the prostatic portion of the urethra, and indeed the entire genitals. The bowels should be kept regular and the movement soft by means of an abundant fruit diet and prompt and regular attention to the calls of nature. If the stools are very dry, the difficulty may often be overcome by kneading and percussing the bowels three or four times a day.

If the stools are not dry, but there is a want of inclination to move the bowels at the proper time, this condition may be relieved by simply injecting into the bowels a small quantity of glycerine and water, a teaspoonful of glycerine to three or four tablespoonfuls of water being about the right proportion in quantity. Use this about one hour after breakfast, the time when the bowels naturally move. If there is an irritability about the rectum, wash it out with half a pint of cool water after each time the bowels move.

Bathing.—Daily bathing is essential, not only to maintain the health of the skin, but to encourage the assimilative processes by which the general nutrition

is maintained. The cool morning bath is one of the best means of toning up an exhausted nervous system. It may be taken by means of a sponge or a towel, as directed elsewhere in this volume. Pure water may be employed, or a little ammonia, vinegar, or salt may be added. These should be used as follows: Ammonia water, one dram to the quart of water; vinegar, one part to four of water; salt, a tablespoonful to the quart of water. A soap-and-water bath should be taken once a week. In cold weather, the above may be followed by an oil rub, to prevent taking cold. A cool or tepid sponge bath should be taken at least three or four times a week, and it is better that the bath should be taken daily.

The sitz bath, described elsewhere, is a most excellent means of relieving local congestion, which is one of the most potent causes of this malady. The temperature of the bath should be about ninety-two degrees, and the bath should be continued twenty or thirty minutes. It is best taken just before retiring at night. Persons who are strong physically may take this bath every night before retiring. In other cases, in which the general health is much impaired, the bath had better be taken not more frequently than three or four times a week.

The wet girdle should be worn at night, especially in cases in which there is a tendency to constipation due to deficient secretion, which is the case when the stools are inclined to be hard and dry. The girdle may be worn at night only, or in the warm seasons of the year, day and night. In cold weather, it is best to remove the wet girdle in the morning, replacing it by

a dry flannel to be worn during the day. The effect of the wet girdle is to stimulate the secreting glands of the intestines to increased activity, causing them to throw into the intestines a large amount of fluid, the deficiency of which is one of the most frequent causes of constipation, this being, as we have elsewhere observed, a very powerful predisposing cause of nocturnal losses.

In connection with the use of the girdle for relief of constipation, the bowels should be thoroughly kneaded and percussed with the hands several times a day, particularly on rising in the morning. The effect of this is to increase the peristaltic movements of the intestines, thereby encouraging normal activity. Move the bowels at a regular time each day, the proper time being half an hour to an hour after breakfast. If necessary, the enema must be employed.

The enema is also an excellent means of relieving local irritability. When employed for this purpose, the quantity taken should not be large, not more than one or one and a half pints, and the temperature of the water should be considerably lower than that of the body, say seventy or eighty degrees. It should be slowly introduced, and should be retained fifteen or twenty minutes. The cool enema should be taken at night, half an hour before retiring.

Applications to the Spine.—One of the most effective means of relieving the irritable weakness of the lower portion of the spinal cord, which is the direct cause of seminal emissions, is to be found in the application of heat, either in the form of hot fomentations, sponging with hot water, or alternate hot and cold

sponging. The hot pour, administered to the lower portion of the spine, the patient sitting upon the edge of a washtub or other receptacle while water is poured upon the spine from a dipper, is a very efficient mode of applying heat to this part of the body. The effect of these applications in controlling the morbid activity of the sexual organs is very marked indeed, and may be considered one of the most important means that can be employed in these cases.

Medicinal Agents.—There are certain drugs which possess the property of lessening nervous irritability or benumbing the nervous sensibility, and have a temporary influence over this disease. It should be borne in mind, however, that drugs are capable of being easily abused, and that their continued use results in harm, not only to the nervous system, but to the digestive organs.

The medicines sent out by the multitude of quacks who advertise to cure this malady, if not wholly fraudulent in character, usually consist chiefly of bromide of potash, which, by checking the emissions, induces the individual to believe that he is cured. In the vast majority of cases, however, the effect of the drug lasts only as long as the medicines are being taken, or at best but a short time afterward. The continued use of drugs of this class, advertised so liberally by charlatans, is invariably bad. Patients usually find themselves in a worse condition than at first, after spending a considerable amount of money for nostrums which at the very best could do very little good, and are pretty certain to do great harm.

Unfortunate indeed is the young man suffering with this malady who falls into the hands of one of the many human sharks that abound in all our large cities, and are watching every opportunity to prey upon young men who may be led to seek them for advice. The first effort is to excite the mind of the patient to the highest degree of alarm respecting his condition, even causing him to imagine that his case is almost hopeless, where in many cases the existing disease is so trifling that the patient might with perfect propriety be recommended to forget it altogether. No young man suffering in this way should ever place his case in the hands of a physician whose character he does not know to be above reproach. It is far better to place confidence in the family physician than to consult one of these so-called "specialists," who are generally ignorant pretenders, skilled only in the arts of deception, and in ways and means of decoying victims into their money-taking net.

DIURNAL EMISSIONS.

Under the above head are included all forms of involuntary discharges, whether seminal or not, occurring in the daytime, with the exception of the discharge accompanying gonorrhea, or gleet. In the healthy state, the urethra is subject to no discharge at all, except as the result of sexual excitement. In a state of disease, discharges occur which may or may not be attended by venereal excitement or sensation of any sort.

There has been much discussion respecting the significance and importance of these diurnal discharges.

Some have undoubtedly exaggerated the importance of this symptom, especially when the discharge only amounts to a very small quantity, as a drop or two of clear, transparent fluid, while others have perhaps underestimated its importance, expressing the opinion that the symptom is never of serious import, except as it gives rise to feelings of apprehension on the part of the patient. · It is undoubtedly true that patients are often unnecessarily apprehensive, feeling uncalled-for alarm on noticing the presence of a slight discharge on going to stool, or after passing urine; but from extensive observations in cases of this sort, we are convinced that the real danger is to a large extent not understood by physicians who have not given the matter careful study, and that quite as much harm has been done by the failure of medical men to appreciate the necessity of making careful investigation of the facts whenever the patient complains of an abnormal discharge of this character, as from the over-anxiety of those whose fears were greater than the circumstances of the case would justify.

Some may consider it absurd that the loss of so small a quantity of fluid of any kind whatever as is observed in many patients who suffer in this way, is an adequate cause to account for the numerous and serious symptoms of which such persons complain; and it may be concluded with justice that many of the distressing sensations and conditions which these sufferers mention are the result of a morbid imagination, and do not arise directly from the symptoms referred to. Yet any physician who has had a large experience with this class of patients must certainly

admit that, however much there may be of diseased imagination in these cases, there is still much which must be chargeable to morbid physical states. It may also be suggested that, in many cases at least, the long train of unpleasant symptoms which the patient experiences is not the result of the involuntary discharges, but that the latter symptom is with the rest the result of some underlying morbid physical condition to which all the symptoms are due, and is simply a local expression of the general disease. We have frequently observed in the history of these cases that the involuntary discharges did not appear until many of the other symptoms had been long present. Cases of this sort are usually those in which general nervous debility, arising from indigestion, excessive labor, either mental or muscular, with deficient sleep, intemperance, or other similar causes, is a permanent feature.

The important relation of these discharges to the general health of the body is, however, sufficiently established by practical experience, which clearly demonstrates that the checking of such a discharge by the employment of either general or local measures, or both combined, usually results in an unmistakable gain in the patient's physical condition, and the removal of a great share of the distressing symptoms of which he complains. This fact justifies giving to this class of patients serious and careful attention, sufficient, at least, to determine the nature of the discharge from which they are suffering, and to secure the adoption of such means as will be most likely to result in the cessation of the abnormal discharge. This course would be at least commendable, even if it were demon-

strated that the discharge itself was a matter of no consequence, since the mental distress suffered by patients who consult a physician respecting a discharge of this character, is usually so great as to be itself a cause of serious danger to health, and to demand the employment of every proper means which may bring relief. The importance of setting such a patient's mind at rest by removing the symptom upon which his mental perturbation is based, is too well recognized by physicians experienced with this class of cases to need emphasis here.

The Character of the Discharge.— In order to understand the nature of these discharges, it is necessary to recollect the fact that the natural seminal discharge is a mucous fluid, composed of various secretions formed at several points along the seminal and urinary passages. *First,* we have spermatozoa, formed in the testicles; *secondly,* a mucous secretion, formed in the seminal vesicles; and *thirdly,* a clear, glairy, and somewhat viscid secretion, formed by the glands of the prostate. Diurnal emissions may consist of any one of these secretions, or of two or all combined. The amount may vary from a single drop to one or two drams. In the majority of cases, the discharges consist of one or two drops of a thick, viscid, or milky fluid, appearing at the end of the urethra after passing the urine, or during erections under strong sexual excitement. Not infrequently, however, in cases in which the sexual organs are very much weakened by abuse, the mere stimulus of erotic thought or any mechanical excitement whatever, is sufficient to produce the venereal orgasm, accompanied by the ejaculation of a con-

siderable quantity of seminal fluid. The clear, viscid fluid mentioned above, is simply prostatic secretion. Microscopical examination will rarely if ever disclose the presence, in this form of discharge, of spermatozoa, the characteristic element of seminal fluid. The opaque discharge, even if the quantity is only one or two drops, may contain a larger or smaller proportion of spermatozoa. It usually consists chiefly of opaque mucus from the glands of the prostate, and is due to catarrh of this part.

The frequency of these discharges varies greatly in different cases, and at different times in the same individual. Sometimes they are noticed at intervals of several days or of several weeks, occurring only as the result of special provocation, as intense and prolonged, but ungratified sexual excitement, the exceedingly detrimental effects of which have been previously pointed out. In other cases, the discharges occur with greater frequency, daily, or even several times a day, and with little apparent cause, perhaps without the knowledge of the individual. Indeed, in some cases, discharges may occur with the urine, and wholly without the knowledge of the patient, and can be brought to light only by a careful microscopical examination of the urine by a competent person. We have met a number of instances of this sort in which the individual had been long suffering with great physical and mental debility, and had been treated for various maladies, but without other results than temporary palliation of their distressing symptoms. On making a urinary examination, the real cause of the debility and suffering was discovered by the presence in the

urine of great quantities of spermatozoa, though previously this cause had not been suspected.

The real nature of a urethral discharge cannot be determined by other means than a careful microscopical examination with a microscope of sufficient power, used by a person who is familiar with the normal and abnormal conditions of the secretions of the seminal and urinary passages. We have frequently found spermatozoa present in cases in which we thought the discharge to be simply a quantity of urethral mucus or prostatic secretion. It should be borne in mind that the quantity of the discharge is no proper criterion of the gravity of the conditions which may exist in connection with it. It is not the amount of fluid lost which occasions the damage to the system, but rather the reflex irritation arising from the morbid condition of the sexual organs, which makes such a discharge possible. There is always, in these cases, an irritable condition of the urethra, and in the worst cases, in which the discharge occurs unconsciously with the urine, a relaxed condition of the ejaculatory ducts. Through the spinal cord, this morbid irritability reflects a perverse influence upon the whole nervous system, and through it upon the entire body, producing excessive debility, and that general disorder of mind and body of which this class of sufferers furnish so many conspicuous examples.

Exciting Causes of Diurnal Emissions.—These discharges invariably occur, *first,* during sexual excitement; *secondly,* in connection with defecation, or movement of the bowels; *thirdly,* with micturition, or passage of the urine, or immediately after the bladder has been emptied.

In a healthy individual, one who has never been addicted to sexual excess of any sort, it is scarcely possible that mental influence alone would effect a sufficient degree of local excitement to produce the sexual orgasm, accompanied by the seminal discharge; but persons who have injured the sexual organs by any form of excess, and particularly masturbators, have thereby weakened the nerve centers which control the operations of the body, and thus produced such a degree of local irritability that much less than the ordinary amount of excitement is required to produce the venereal crisis. These individuals often bring themselves into such a state that even the thought of the sexual act is sufficient to produce ejaculation. Sometimes, indeed, those who have abandoned themselves to the gratification of their passions, having discovered the readiness with which the venereal excitement may be produced by lascivious thoughts, give themselves up to what may be called "mental masturbation," by which they are ultimately reduced to the lowest possible state of physical and mental degradation. At first, the seminal discharge is accompanied by an erection; but after a time, the erections grow more and more feeble in character until there is no erection, nor indeed other than a very slight degree of sensation. Ultimately, in fact, the sensation ceases to be in any degree pleasurable, becoming only a slight burning, or of a decidedly painful character. Some of these victims of lust become at last reduced to such a state that the mere sight of a passing female or a painting or bust of a female figure will produce ejaculation, though not accompanied by either erection or

sensation. In some cases, discharges occur several times a day, keeping the individual in a wretched state of mind and body by the terribly exhausting drain upon his vital forces.

The author has met a few cases in which the ejaculation resulted not from the excitement of sexual thoughts, but from some physical or mechanical cause. From personal observation, we should say that in cases in which seminal discharges are produced by the causes named, the individual has usually been addicted to some form of sexual vice. In fact, it hardly seems possible that ejaculations should be produced by such slight causes, unless the organs have been previously weakened by abuse. In cases in which there have been great sexual excesses, the organs sometimes become so weakened that ejaculation may result from so slight a degree of mechanical excitement as the jolting of riding over a pavement in a wagon, or even the jarring of a railway car.

The discharge which occurs in connection with defecation is usually the result of constipation of the bowels. The exertion required to expel a large, dry stool, or the pressure of the feces upon the seminal vesicles, squeezes out a few drops of viscid fluid, which may or may not contain spermatozoa. That spermatozoa are generally present in the seminal vesicles is rendered probable by the results of numerous examinations made and reported by competent observers, though the use of the seminal vesicles as a reservoir for seminal fluid is questioned by some modern authorities. The truth probably is that these sac-like structures serve the double purpose of receiving and re-

taining the spermatozoa, and forming a secretion which acts as a vehicle for them. It is probable that spermatozoa are sometimes present and sometimes absent from the seminal vesicles, according to the degree of activity of the testicles.

Usually, the discharge occurring at stool is entirely without sensation; but it is sometimes accompanied by a slight burning or a peculiar sensation, somewhat approaching in character, though different from, that accompanying normal ejaculation. We have met a single instance in which the regular seminal ejaculation occurred in connection with defecation.

Diurnal emissions are probably most frequent in connection with the passage of urine. The discharge may occur either before or after the escape of the urine, or it may be mixed with the urine. In order to discover the relation of the discharge to the urinary act, it is necessary to instruct the patient to obtain three specimens of urine in separate bottles. The first should consist of the first two ounces passed, the second, of an equal quantity of the middle portion, and the third, of the very last portion of the urine expelled from the bladder.

When spermatozoa are found only in the first urine passed, the indication is either that a few spermatozoa had been left in the urethra after a nocturnal emission or normal coitus, or that a small quantity had found its way from the ejaculatory ducts into the urethra, probably the result of a relaxed condition of the orifices of these ducts.

When spermatozoa are found in the last portion of urine expelled from the bladder, probably they will

have been pressed out of the vesiculæ seminales, or the ejaculatory ducts, by the concluding efforts of expulsion.

Spermatozoa found in the middle portion of the urine indicate that a discharge of seminal fluid has taken place into the bladder. This symptom signifies a very grave state of affairs. It is often the result of interrupting the ejaculation after it has begun, by compression. The normal outlet being obstructed, the semen is forced back into the bladder. The great injury resulting from this practice should be thoroughly understood.

Discharges connected with the first and last portions of urine usually appear as a few drops of opaque, and usually viscid fluid, squeezed out after the last portion of urine has passed. When the seminal fluid is passed back into the bladder, and mixed with the urine, its presence in the urine will not be indicated to the naked eye unless the quantity is very large, which is seldom the case. The whitish deposit which appears in the urine immediately after it is passed, or after it has been standing for some time in a vessel, almost always consists either of urates, phosphates, or mucus from the bladder. The relative frequency of the occurrence of these three substances is in the order mentioned. The exact nature of the deposit cannot be determined without a careful microscopic examination, though if carefully applied, the following tests will often suffice:

If a whitish deposit settles flat in the vessel, it is probably made up of phosphates or urates. If shreds of a whitish color float up into the urine above the

deposit, it is undoubtedly composed, in part at least, of mucus. Urates and phosphates may usually be distinguished by the fact that urates appear only when the urine is cold, while the phosphates will be observed as soon as the urine has time to settle, and before cooling takes place. When present in considerable quantities, the phosphates often give to the urine a milky appearance when passed, which frequently leads to the supposition that large quantities of seminal fluid are escaping in this manner, whereas careful examination may show that the urine does not contain a single spermatozoon. When the deposit is composed of urates, it may be made to disappear entirely by simply reheating the urine. Phosphates will not disappear by heating, but are quickly dissolved by adding to the urine a quantity of strong vinegar or any acid.

Persons who have been addicted to sexual excesses are often led to believe that their condition is even more serious than it is by the observation of these deposits in the urine. While we would not say anything that would comfort these individuals to such an extent as to encourage them to continue their abuses, a desire to present the subject in a fair light leads us to repeat what has already been said, that these deposits are very rarely of a seminal character, and that it is only in the very rarest cases that spermatozoa are found in the urine in sufficient quantities to be apparent to the eye, except by the aid of a very powerful microscope.

Results of Diurnal Emissions.—Some of the consequences of these abnormal discharges have already been intimated. The results of their long continuance may be summarized as follows:

1. General nervous exhaustion, accompanied by all the mental and nervous symptoms of sexual neurasthenia, or nervous debility, which have already been pointed out, and need not be repeated here. The patient is usually given to despondency, sometimes being driven almost to distraction by his mental suffering, a great share of which is undoubtedly the result of a morbid imagination, which has become diseased by allowing the mind to dwell upon the abnormal conditions, closely watching and exaggerating every symptom, and attributing every morbid sensation to the one symptom which he believes to be the foundation and cause of all his troubles.

2. Various disorders of digestion, which arise partly from a morbid mental state and partly from the physical exhaustion resulting from the constant drain upon the body. It is possible, also, that the reflex influence of the local irritation upon the nerve centers which preside over the digestive organs may have something to do with producing the obstinate dyspepsia which is frequently found in these cases, and to which much of the physical debility may be fairly attributed, though usually charged entirely to the unnatural losses.

3. Various disorders of the bladder, particularly, frequent and painful or difficult urination. A very frequent symptom is smarting at the beginning of the act, and a persistent dribbling, which continues for some time after the great portion of the urine has been expelled from the bladder. The latter symptom is due to the relaxed condition of the muscles about the neck of the bladder, by reason of which they fail

to contract promptly at the close of the act. This symptom is usually indicative of a similar condition of the muscles which guard the mouths of the ejaculatory ducts, by reason of which the seminal fluid is allowed to escape in a similar way whenever the vesiculæ seminales become overfull, a condition likely to be constant in these cases in consequence of the excited state of the testicles arising from erotic thoughts.

4. As the most constant of all the results of this morbid condition, must be mentioned the weakening of the sexual organs themselves. The functional ability of the sexual organs is confined within narrower limits than that of any other class of organs in the body. A frequent or continuous drain upon their vitality soon impairs their natural vigor, and weakens them, often to such an extent that perfect restoration to healthy activity becomes impossible. An individual who is subject to diurnal emissions is already well advanced on the road to complete impotence, and should place himself in the hands of a physician competent to deal with his case in such a manner as it may require. Cases of this sort, in which the discharge consists chiefly of seminal fluid, were once considered practically hopeless; but modern advances in the methods employed in treating this formidable form of sexual disease, give the skilful physician means of relief which afford a fair prospect of a cure, if properly and perseveringly employed.

Treatment.— The treatment of the graver forms of diurnal emissions, in which there is actual loss of seminal fluid, requires the personal attention of a physician skilled in the treatment of this class of maladies,

and these cases cannot be considered proper subjects for home treatment. However, the observance of the principles laid down in this work, and the specific directions which are given, will do much to mitigate the symptoms arising from the disease, and to check its progress. The lighter forms of the malady, those in which the discharge consists of simply a prostatic fluid or mucus from the vesicles, may often be substantially relieved by the employment of such simple measures as can be used without the superintendence of a physician. The most essential of these measures are the following:

1. The ventral sitz bath. This may be taken as directed for the treatment of nocturnal emissions.

2. The employment of such means as will secure proper activity of the bowels. A wet bandage worn at night, as elsewhere directed, the liberal use of fruits, the practice of kneading and percussing the bowels several times daily, careful attention to the moving of the bowels at a regular time each day, and, if necessary, the use of the cool enema (75° F.) to soften the contents of the bowels, and secure a daily evacuation, are means which are to be particularly recommended. The enema should be employed only when regulation of the diet fails to move the bowels, or when the contents of the bowels are so hard and dry as to require great straining at stool, which should be carefully avoided in those cases in which discharges occur at stool.

3. In cases in which the discharge is due to disease of the prostatic portion of the urethra, it is usually accompanied by an irritable condition of the prostate

gland. For the relief of this condition, the hot enema and hot rectal irrigation and other measures recommended in the treatment for "irritable prostate" should be employed.

4. The diet should be unstimulating, free from condiments and stimulating foods of all kinds. Tobacco, alcoholic liquors, and tea and coffee should be strictly avoided. An abundance of exercise should be taken daily, and the patient should avoid violent muscular exertion, such as jumping, etc. Horseback and bicycle riding are to be condemned when they produce local irritation or excitement, which is usually the case.

5. The mind should be kept free from lascivious thoughts. Without strict attention to this rule, all measures of treatment will be of little avail.

6. If any cause of local excitement exists, such as a long or tight prepuce, varicocele, anal fissure, or fistula, these causes should be removed by the necessary treatment or operation.

7. In cases in which there is distinct evidence of relaxation of the ejaculatory ducts, the proper application of electricity is a measure which often affords most excellent results. Faradic electricity is very useful in restoring the lost tone of the organs, and contracting the relaxed ejaculatory ducts. It should be applied directly to the diseased parts, one pole being applied to the urethra, the other upon the lower portion of the spine over the bladder, at the perineum, the testicles, the inner side of the thighs, or upon each of these points successively. In particular cases, the galvanic current is to be preferred to the faradic, though a considerable degree of experience is neces-

sary to discriminate between the conditions requiring the one or the other of these forms of electricity.

8. In cases in which the discharge is due to a relaxed condition of the ejaculatory ducts, sitz baths should be employed at a temperature of 75° to 65°, to be taken as directed elsewhere. The length of time occupied by the bath should be fifteen to twenty minutes. The cool enema is another excellent means of toning up the relaxed muscles. It should be taken daily, and the quantity should be about one-half pint. The psychrophore, or cooling sound, is also very useful in these cases. The cold spinal pour, employed by pouring cold water on the lower portion of the spine from a dipper, while the patient sits over a tub or some other convenient vessel, is an excellent means of stimulating the nerve centers so as to tone up the relaxed organs. Continue three to five minutes. After the pour, the spine should be rubbed thoroughly, to secure good reaction.

TRUE SPERMATORRHEA, OR SPERMORRHEA.

Under this head are included those cases in which the seminal discharge is not only involuntary in nocturnal emissions, but occurs unconsciously even in the daytime. Cases of this sort are among those referred to under the head of diurnal emissions, being the gravest class mentioned under that head. The extreme gravity of this class of cases renders it important that they should receive special attention in a separate chapter. Respecting the causes of true spermatorrhea, or spermorrhea, much more might be said than we

shall have space to offer here, but the following observations we consider most important:

1. The grave symptoms which accompany this disease are not wholly due to it, but are frequently the result of some condition of which the spermorrhea is also a symptom. The most active of constitutional causes are nervous exhaustion and general debility. It is frequently observed to make its first appearance in an individual who has previously suffered with no disease of this sort, during a convalescence after an attack of fever or during the incipient stages of tuberculous diseases or consumption, when the vital powers are somewhat enfeebled, though the sexual organs are still active. There is undoubtedly, in some persons, a constitutional tendency to this disease. It is quite possible that men who have suffered in this way themselves, transmit to their children a predisposition to the same malady. Certain it is that in some individuals very slight excesses will give rise to this affection, while others seem to be almost proof against it, indulging for many years, with apparent impunity, in excesses of the grossest character, although the penalty of their transgressions is certain to be inflicted in later years, in some of the most distressing forms of sexual disease.

2. It has been noticed that there is some relation between this disorder and epilepsy and insanity. An inquiry into the family history of persons suffering in this way will often reveal the fact that one or more near relatives have been affected with epilepsy or some form of mental disease, and the individuals thus suffering are themselves not infrequently

epileptic or affected with some phase of mental disease, though usually in a mild form, and nearly all are of an exceedingly excitable temperament. In the early history of these cases, it will frequently be found that when very young, they were afflicted with incontinence of urine, a disease due to an irritability of the bladder and an abnormally excitable condition of the nerve centers controlling its action. In consequence of this state of the bladder, during sleep, when the restraining influence of the mind cannot be brought to bear upon the spinal centers which induce the bladder to contract, when full, and empty itself of its contents, these centers, being abnormally excitable, are induced to cause contraction of the bladder and expulsion of its contents before the organ becomes sufficiently full to provoke such an action of the controlling nerve centers in a healthy person.

On attaining puberty, when the sexual functions become active, and the seminal secretion makes its appearance, this abnormal activity is transferred from the bladder to the sexual organs, resulting in nocturnal pollutions, which are substituted for the previous urinary discharge. This sort of substitution is particularly liable to occur in cases in which masturbation, or any other form of sexual abuse, has been indulged in, or if the sexual organs have been prematurely excited by erotic thoughts; but we have met cases in which the losses began to occur about the age of puberty, in which we could discover no evidence that any form of sexual abuse had ever existed. In these cases the disorder was probably due to a disordered condition of the general system.

3. Sexual excesses are undoubtedly by far the most common and powerful causes of this affection. These include not only marital excesses, but masturbation, "mental masturbation," and all forms of sexual vice. According to the statements of French veterinarians, stallions that are brought in contact with mares, but not allowed to "cover" them, are frequently subject to this disease, which demonstrates the fact already hinted, that excitement of the genital organs, through allowing the mind to dwell upon sexual subjects, may produce the very worst results of sexual abuse.

How Sexual Abuses Produce Spermorrhea.— During sexual excitement, the entire sexual organs are subject to the most intense congestion, during which the blood-vessels are enormously dilated, and subjected to a high degree of tension. If this overwhelming tension occurs frequently, the blood-vessels of the parts become relaxed so that they retain continually too large a quantity of blood. In other words, they become chronically congested. This condition results in the production of too large a quantity of seminal fluid, in consequence of which the seminal vesicles become overloaded, producing an unpleasant sensation and fulness in the parts, or erethism, which is usually accompanied by erections, calling attention to the parts and giving rise to erotic thoughts, which still further aggravates the difficulty. In the urethra, particularly the prostatic portion, which contains the orifices of the ejaculatory ducts, the mucous membrane becomes the seat of chronic congestion, which renders it abnormally sensitive. The urine, which normally does not affect the urethral membrane at all injuriously, causes smart-

ing and burning of this sensitive portion; and thus whenever the bladder is relieved, an aggravation of the condition occurs. The long-continued irritation produces, ultimately, a semi-paralyzed condition of the muscles which close the orifices of the ejaculatory ducts, in consequence of which the seminal fluid is allowed to escape whenever the erections occur, and without the ordinary ejaculatory act. In the worst conditions, the semen sometimes even dribbles away continually. As is the case with the nasal mucous membrane, and mucous membrane in other parts of the body, the long-continued congestion gives rise to thickening. In consequence, the urinary canal is lessened in caliber. At first, the thickening is simply a swelling, which is readily overcome by the force exerted in relieving the bladder; but after a time, the thickening becomes permanent, and then partial, or even complete, stricture is produced.

The irritation sometimes extends to the seminal vessels, producing catarrh of these parts, and sometimes a gleety discharge, in consequence of which the seminal fluid becomes vitiated and diseased, even to such a degree as to produce sterility. The inflammation may even extend down into the testicles, producing disease of these organs, accompanied by neuralgiac pains, and often inflammatory processes followed by degenerations, in consequence of which the testicles gradually soften and waste away. The spermatic veins, particularly those of the left side, frequently become enormously enlarged, producing varicocele, with its numerous inconveniences. The local irritation not infrequently extends up into the bladder, causing irritability

of the bladder, and often catarrh of this organ. In one case, at the *post-mortem* examination of which the author was present, in Bellevue Hospital in New York City, the irritation set up in this way had extended not only into the bladder, but through the ureters into the kidneys, finally resulting in death, after many years of horrible suffering.

But the changes produced in the genital and urinary organs are not the only results of excess, nor indeed are they the most important. The sexual organs are governed by nerve centers placed at the lower portion of the spinal cord. The secretion of semen by the testicles, and its discharge through erection and ejaculation, are under control of these nerve centers. Erections may occur as the result of the stimulation of these centers by the mind through erotic thoughts, or by reflex irritation arising from the organs themselves, or from contiguous parts, as in irritations of the rectum from piles, fissure, etc. The irritation resulting from the congestion caused by frequent sexual excitements, keeps the nerve centers in a state of constant activity, so that erections occur much more frequently than would otherwise be the case, and the testicles are stimulated to secrete an abnormal amount of seminal fluid, which, though increased in quantity, is greatly deteriorated in quality. The nerve centers themselves, being weakened by continual excitement and constant drain upon them, lose their normal tone; that is, they are brought into a condition in which they are unable to accumulate the proper amount of nervous energy, but are by very slight causes induced to spend the little nervous energy accumulated, in prolonged erections or

even ejaculations. During sleep, the general nerve tone and the tone of the sexual centers is still lower than during wakefulness. It is on this account that seminal losses occur during sleep, from dreams, even though the same amount of sexual excitement would not produce erections when awake. The nerve tone gradually goes lower and lower, as the disease advances, until it finally reaches a point at which ejaculation is allowed to occur during sleep from so slight a degree of excitement as that arising from fulness of the bladder, or the slight overheating of the spine from lying upon the back.

Only one step farther in the lowering of the nerve tone of the controlling nerve centers is required to produce involuntary discharges when awake. Still another advance, and the discharges occur with very feeble erections, and finally with no erection at all, and only a slight sensation. The seminal fluid, the most precious of all the secretions of the body, is now allowed to dribble away upon the slightest provocation, continually wasting the vital forces, and undermining the bodily powers until the man, once noble and intelligent, is reduced to a mere semblance of humanity, and is ruined, physically, mentally, and morally.

Of local causes, the most important are irritation of the bladder and urethra, which may be either primary, or the result of gonorrhea, inflammation of the seminal vesicles, long and tight prepuce, accumulation of secretion about the glans, constipation of the bowels, and the condition known as varicocele, or enlargement of the spermatic veins.

Symptoms.—Among other symptoms of spermatorrhea which have not been mentioned in the above

description of morbid conditions, we enumerate the following:

A dull aching in the lower part of the back, usually termed by patients "the small of the back," particularly in the morning, or after making muscular exertions, and always aggravated by seminal discharges; stiffness of the limbs and want of muscular endurance; weakness of the knees, numbness, and strange sensations in the arms and legs; muscular twitching; pressure at the back of the head; numbness of the spine; numbness or abnormal irritability and sensitiveness in various parts of the body; dry and pasty skin; baldness; headache; loss of memory; dulness of apprehension; general loss of mental capacity, and incompetence to sustain any prolonged mental effort, particularly after the occurrence of an emission; shortness of breath; dizziness; blurring of the sight; noise in the ears, and temporary deafness; hesitant and stammering speech; constriction or oppression in the chest; heartburn, sour stomach, feeling of weight at the stomach, constipation, and other symptoms of dyspepsia; great depression of spirits, sometimes even amounting to insanity, with a tendency to suicide; unsteadiness of gait; coldness in the extremities; wandering pains about the body; loss of confidence; palpitation of the heart; flushing of the face; emaciation; pain in the side; tenderness of the spine; loss of erectile power, resulting in impotence; coldness, numbness, or loss of natural sensation in the sexual organs; relaxed or shrunken condition of the sexual organs; blueness of the organs; tenderness or dragging sensation in the testicles; pain in the spermatic cord or the groin; un-

natural softness or tenderness of the testicles; smarting or burning on urinating; dribbling after urination; muscular twitching in the perineum, or fork of the thighs; unnatural excitability of the organs, as indicated by frequent, painful or prolonged erections without erotic thoughts.

If an individual has inherited any tendency to insanity, epilepsy, locomotor ataxia, or paralysis, he is pretty likely to fall into some of these conditions. The ultimate results of spermatorrhea are the most disastrous possible. It is true, the patient does not often die of the disease itself, but the terrible drain upon his vital powers develops some constitutional malady, or so weakens his vital capacity as to lay him open to the attack of some acute disease, by which his miserable existence is ended. Consumption is exceedingly common among these victims of sensuality. We have met a number of instances of consumption in which the disease was evidently the result of the weakening influence of spermatorrhea. Insanity, epilepsy, dyspepsia, rheumatism, apoplexy, and nearly every disease, in fact, to which human flesh is heir, may occur as the secondary result of spermorrhea.

Treatment. — The illustrious French physician, Lallemand, was the first to give to this disease the attention and thorough scientific investigation required to establish its treatment upon rational principles. His success attracted the attention of scientific physicians in every part of the world, and the interest excited in this malady, previously considered all but incurable, has developed means and methods of treatment which are efficient in the great majority of cases in restoring

the patient to comfortable, if not perfect health. Many cases are susceptible of a perfect cure. These are those in which the malady has not existed for so great a length of time as to produce extensive degeneration of the parts. The most readily curable cases are those in which the disease is dependent upon some morbid physical condition which can be promptly removed, as a long or tight foreskin, piles, or varicocele, which may be removed by the proper surgical treatment. Fortunately, these cases constitute quite a large proportion of the entire number of sufferers from this malady.

The cases which are the most difficult to cure, and in which a restoration to health is least likely to be complete, are those in which the disease is wholly the result of long-continued sexual excesses, particularly repeated self-abuse, and mental masturbation. When the practice has been continued long enough to produce great weakness of the sexual powers, and serious impairment of the general health, it is not probable that the sexual vigor can be perfectly restored, though the general health may be built up to such a degree as to render the patient able to engage in the ordinary duties of life. Indeed, the improvement in some of the worst of these cases is something remarkable when a thoroughgoing course of rational methods can be instituted and faithfully carried out. The greatest thing in the way of recovery is the inability of the patient to co-operate with the wise physician in his efforts to rescue him from the results of his evil practices. Failure to control the mind is one of the greatest impediments in the way of a cure. The patient should understand thoroughly that unless he can accomplish this,

the most skilful treatment possible can do him no good. His recovery, if it is secured, will be largely the result of his own efforts. If his will-power is so weakened, and his self-control so destroyed, that he cannot purify his mind from lascivious thoughts, his case is a hopeless one. Some degree of improvement may be secured, but recovery is impossible.

The measures of treatment to be employed in the management of spermorrhea are essentially the same as those enumerated for the relief of sexual nervous debility, nocturnal emissions, and diurnal emissions, the symptoms and morbid conditions of all three of these disorders being present in this disease. This being the case, we need not recapitulate what has been said respecting the treatment under the three heads mentioned, but will refer the reader to the sections named for directions respecting diet, exercise, baths, etc.

In some cases, it will be found that the discharges are provoked by irritability of the bladder, resulting from catarrh of this organ, or from rectal irritation arising from thread-worms. In these cases, the exciting causes must be removed by appropriate treatment. To remove thread-worms, adopt such measures as will keep the bowels loose and regular, and then inject into the bowels two or three quarts of a decoction of quassia chips, one-fourth pound to the gallon of water, first washing out the bowels by a large enema of warm water, together with a little castile soap.

Marriage. — Physicians are constantly asked by young men who are suffering from the results of self-abuse, May I marry? A large number of physicians,

perhaps a majority, will have already anticipated this question by advising the patient to seek a wife as the best means of curing his malady. The amount of wretchedness, mental and physical, which has resulted from this random and haphazard advice, is too great to be estimated. The author has met scores of married men who have expressed the deepest regret that they had received and followed such advice. A young man who is suffering from sexual disease, wrongs both himself and another by entering the married state. Frequent seminal losses, as the result of masturbation or other sexual abuse, indicate a diseased condition which will only be aggravated by marriage. There is no curative virtue in the sexual act for one who is already suffering from the results of sexual excesses; and if it were so, what right has any physician to recommend a man to take a wife as he would make any other prescription? What right has a man to seek a wife as he would visit a druggist for a bottle of medicine? Let the young man, before he takes such advice from a physician, quietly imagine himself in the place of the woman he may marry, acting simply the part of a medical prescription to a diseased man. We consider this advice absolutely immoral, and the young man who follows it is guilty of the grossest disregard of human rights. Any man who is suffering from the results of self-abuse, or any other sexual excess, has no right to marry until these results have been removed by proper treatment or a proper course of life. It is true that this cannot always be done to the fullest extent, but recovery should be at least sufficiently perfect to render marriage in no way harmful to the man,

and to the woman not simply a prescription for a diseased husband.

Bad Medical Advice. — Not infrequently, when a young man seeks the advice of a physician for relief from nocturnal emissions or some other conditions, on being advised to marry, demurs, and objects that he is not prepared to settle down in life, or that he is acquainted with no one whom he desires to marry. What advice does he then receive? Unfortunately, there are physicians who are so lost to all sense of propriety and purity and so reckless of the interests of their fellow-beings that they do not hesitate to advise such a young man to "keep a mistress," or even to visit houses of prostitution, taking pains to instruct them in all the particulars of their conduct in the practice of immorality. We do not hesitate to say that such men are a disgrace and a dishonor to a noble profession. Repeatedly, cases have come to our notice in which young men have been led to abandon themselves to a life of infamy by such advice, and we have met several cases in which the various forms of venereal disease, including that most horrible of all maladies, syphilis, have been contracted by following the unwise counsel of such unprincipled physicians. No amount of professional advice can make immorality proper, even if it were known that real physical advantage might arise therefrom, the very opposite of which is wholly likely to be true. The writer has met a number of lamentable cases in which young men, even boys, had been thus recommended to enter upon a life of immorality, and in which most horrible consequences resulted. In one case, a lad of seventeen had become infected with syphi-

lis whereby his constitution was ruined for life. In another case, a boy, still in his teens, had, with his father's concurrence, through the advice of a physician, pursued the same course, and quickly becoming infected with gonorrhea, had been reduced to a skeleton by the awful suffering to which he had been subjected through inflammation of the bladder and other urinary organs to which the disease had rapidly extended.

Such advice on the part of a physician is not only wrong, when viewed from a high moral standpoint, but is unethical and unprofessional. No physician has any right to recommend a patient to violate the laws of God and man, even though his wrong education may lead him to believe that such a course might be in some way conducive to his physical benefit, the very contrary of which experience shows to be true. It would be exactly as proper for a physician to recommend a young man to steal a thousand dollars with which to pay his expenses on a vacation trip, or to embezzle the funds of his employer in order to pay for medical advice or a surgical operation. There is no respectable medical authority for any such advice or recommendation, and we do not hesitate to say that the general opinions and experience of the medical profession are positively opposed to it.

DISEASES OF THE PROSTATE.

Acute Prostatitis, or Inflammation of the Prostate.—Acute prostatitis is usually the result of an extension of an inflammation of the urethra to this part, as in gonorrhea. It is also sometimes caused by the application of strong injections into the urethra, or

rudeness in passing sounds; by inflammation of the bladder; the use of alcoholic drinks, and excessive sexual excitement. Exposure of the perineum to cold and dampness, as in sitting upon the ground, is also a recognized cause.

Symptoms.— The first symptoms felt are weight and fulness about the perineum and rectum; slight pain or uneasiness at the neck of the bladder; frequent desire to pass water, which is accompanied by more or less pain, especially at the conclusion of the act. As the disease continues, all the symptoms increase. The pain, which is almost continuous, begins to be severe, and throbbing or shooting in character. There is a sense of great fulness in the part affected, and tenderness about all the tissues in the fork of the thighs. Pain in the back and loins also becomes prominent as a symptom. A sitting position is painful, and nearly all bodily movements aggravate the suffering. There is pain on moving the bowels, difficulty in passing the urine, and chilliness followed by more or less fever. The fingers placed in the rectum come in contact with a large, hard bunch, the inflamed prostate gland, the vessels of which are felt to be throbbing.

This disease usually terminates in a short time, leaving the organ enlarged, often permanently, though sometimes it gradually returns to its natural size. Not infrequently, the inflammation of the prostate becomes chronic, and continues for many months or even years. The disease is often accompanied by an acute attack of piles, between which and prostatitis, both acute and chronic, there is a close relation.

Treatment. — The patient should go to bed, and remain in a horizontal position during the attack. An ice bag should be applied to the perineum continuously. It may be renewed every half hour for five minutes, during which time a fomentation should be applied to the parts, including the inner surfaces of the thighs and buttocks. Once in three hours, instead of the fomentations, wrap the legs and hips in a woolen blanket wrung out of water as hot as can be borne. The wet blanket should be tightly covered with a dry blanket folded double so as to retain the heat. The ice bag should be kept in place during the application of this pack. The pack should continue fifteen to twenty minutes. On removal, each leg should be wrapped in a towel wrung as dry as possible out of very cold water, and wrapped, each separately, with a thickly folded woolen blanket, so as to secure prompt warming. Bags of hot water, and hot water bottles, or other heated bodies, may be placed about the legs if necessary to secure prompt heating. These packs should remain in place during the intervals between the hot blanket packs. This simple means is one of great value in the treatment of pelvic inflammations of all sorts with the exception of inflammations of the bladder, in which cold applications are not permissible. It is especially valuable in appendicitis, in which case the ice bag is placed over the inflamed parts. Prolonged cool rectal irrigation is also valuable. Water at about 75° should be allowed to pass into and out of the rectum for about thirty minutes, which may be repeated every three or four hours. If the urine is retained, an effort should be made to pass it while taking a warm sitz bath,

which will generally be successful. If the bladder is not relieved quite promptly in this way, a physician should be employed to pass a catheter.

A person who is suffering from this disease, is very likely to relapse, particularly if he indulges the passions, or allows the mind to dwell upon erotic thoughts. After recovery occurs, the prostate is found considerably enlarged, and the force of the stream of urine is considerably lessened in consequence of the obstruction due to the enlarged prostate.

Chronic Inflammation of the Prostate.—In this disease, there may be or may not be enlargement of the prostate. There is always, however, a greater or less degree of irritability, which is accompanied by a discharge; difficulty in passing the urine; cloudiness of the urine; weight and dull pain in the perineum and about the rectum; pain in passing water, and in the sexual orgasm. Not infrequently, nocturnal emissions or diurnal emissions occur. Irritability of the bladder is also a prominent symptom. All these symptoms are aggravated by excessive muscular exercise, and errors in diet, particularly the use of stimulating foods, as condiments and an excessive quantity of meat. Alcoholic liquors and the use of tobacco are also highly injurious.

Treatment.—When slight, this condition is often overlooked by the patient, and perhaps does not seriously demand treatment, though when accompanied by nocturnal or diurnal emissions, or serious obstruction of the urinary passages, this disease should be taken in hand without delay, and treated with persevering thoroughness. The most effective methods of

treatment are those which have already been recommended for acute prostatitis, though complete rest need not be enforced. The digestive organs must be kept in good condition. The stools should not be allowed to become hard and dry. All proper means should be taken to improve the general health of the patient, as thereby the advance of the disease may be stayed, and much may be done to ameliorate the unpleasant symptoms which it occasions. When enlargement exists, this condition should be treated as directed in the following section.

Enlargement of the Prostate.—This condition is one which is frequently found present in persons of advanced age, even though no previous acute or chronic inflammation has existed. It is not a necessary accompaniment of old age, however, as cases have frequently been observed in which it did not exist in individuals who were upward of a hundred years of age. Probably about one-third of all men above the age of fifty have prostates more or less enlarged. Any degree of enlargement may exist, as from a size slightly larger than that of health to a diameter of three or four inches and a weight of nearly half a pound. Enlargement of this kind as the result of old age, seldom occurs before the age of sixty.

Symptoms.—A considerable degree of enlargement of the prostate may take place without any symptoms whatever. The first symptom which usually attracts the patient's attention is diminished force in expelling the urine, which is soon followed by a sense of obstruction when performing the urinary act. The size of the stream may be nearly or quite that of health,

but it is very weak in force. There is a frequent desire to urinate, which often occasions serious disturbance of sleep. Among other symptoms are weight, fulness, and uneasiness in the perineum and rectum, straining efforts required in passing water, producing irritation and discomfort of the rectum.

If the disease continues, cystitis, or inflammation of the bladder, often results. Frequent and sometimes painful erections occur. The testicles become tender and swollen. The bladder is not fully emptied, and the urine sometimes gradually accumulates in it, often partially leaking out during sleep, when the voluntary control is suspended. There may be a simple overflow of urine from the bladder, which is likely, if not carefully watched, to become enormously and injuriously distended. To prevent such an accident, careful and frequent examination should be made of the lower part of the bowels just above the pubic bone. In a case which came under our observation some time ago, the bladder was greatly distended, with the upper portion reaching nearly to the umbilicus. The introduction of a catheter gave instantaneous relief from great suffering, which had been endured for several days, by the outlet of fully two quarts of offensive urine.

Very frequently, straining efforts made by the patient occasion the passage of a quantity of blood. The passage of blood is very likely to occur after exposure to cold or sexual excitement. Examination of the urine usually shows a considerable quantity of mucus. The urine usually has a strong ammoniacal odor, due to its retention in the bladder until decomposition takes place.

The general disorder of the bladder and urinary organs sometimes gives rise to calculus, or stone in the bladder.

The presence of an enlarged prostate can always be determined by examination of the rectum with the fingers pressed against the anterior wall, when the enlarged prostate may be very easily felt. In occasional instances, it will be found to be tender, though in many cases it is not abnormally sensitive.

Treatment. — The treatment of enlarged prostate unfortunately affords very little encouragement of a radical cure. All sorts of remedies have been employed for the purpose of producing absorption, but with little avail. Alternate hot and cold irrigation of the rectum, is a measure which succeeds in cases in which the disease has not existed for so long a time as to produce an abnormal growth of the prostate. It is a very serviceable means of removing the thickening and tenderness which is often left behind after an acute inflammation.

The sitz bath is also useful, and is employed in the following fashion: The sitz bath should begin with a temperature of 102°. Hot water is added until the temperature is as high as can be borne, or at least to 110° or 112°, the feet being placed in a hot foot bath at the same time. At the end of three or four minutes, when the skin is well reddened, the hot water is allowed to run out and cold water to run in at the same time, so that the temperature of the bath is gradually lowered to about 70°. The patient remains in this for ten to twenty minutes. The parts which have been immersed are vigorously rubbed so as to secure a reaction. The bath should be taken every day, preferably at night.

When the prostate is painful, hot irrigation of the rectum is useful.

When there is difficulty in passing urine, the catheter must be employed. Great care must be taken to avoid infection. The catheter should be kept immersed in a solution of one part formalin to 200 parts water. A pint jar full of the solution may be kept for the purpose. After use the catheter should be thoroughly washed, then placed in the jar, and the top screwed tight, till again needed for use. If formalin is not obtainable, strong, hot soapsuds may be successfully used. The water should be saturated with soap, and at a temperature near the boiling point. The catheter should be left in this solution for ten minutes before using. Before introducing the catheter, the hands and the genitals should be thoroughly washed with warm, strong soapsuds. The catheter should be passed very gently, care being taken to avoid undue pressure or violence of any sort. The improper use of the catheter often gives rise to inflammation of the urethra, to acute cystitis, and chronic catarrh of the bladder, which greatly aggravates the difficulties which arise from enlargement of the prostate. The inflammation is likely to extend to the ureters and the kidneys, and may terminate fatally; indeed, a fatal termination occurs through involvement of the kidneys in a great majority of these cases, after years of suffering.

When the obstruction is so great that the bladder cannot be entirely emptied without the catheter, surgical interference is, in most cases, positively required. The great improvements which have been made in this branch of surgery within the last few years offer very

great hope, and every person suffering in this way should have the benefit of the advice of a skilled specialist in this department of surgery. The improvement of surgical methods makes it possible to remove the prostate with entire success, and it is likely that this operation will in future be performed much more frequently than in the past, in cases which do not yield readily to the usual measures. The frequent employment of sitz baths at a temperature of ninety-five degrees, is very often a means of great relief, and not infrequently urine can be passed in a sitz bath with perfect ease, though at other times the obstruction is complete.

Irritable Prostate.—A condition of the prostate in which it is sensitive to pressure may be the result of chronic or acute inflammation, but most frequently comes from sexual excesses of some sort, particularly masturbation and marital excesses. In cases of spermatorrhea and all forms of involuntary seminal disorders, it plays an important part in the maintenance of the disorder by producing an abnormal degree of excitability of the parts. It is one of the first things which should receive attention in the treatment of this class of cases. Persons suffering from this condition, complain of smarting after passing the urine, and sometimes notice a heaviness or fulness about the fork of the thighs.

Treatment.— Frequent warm sitz baths, fomentation to the perineum, hot and cold applications to the lower part of the spine, and similar methods, are usually effective in allaying the irritation, provided the most active cause, sexual excitement, is wholly suspended.

Prostatorrhea, or Prostatic Catarrh.—The characteristic feature of this disease is a clear, viscid fluid which escapes from the urethra, especially after an erection has occurred, and on urination. The discharge is the result of catarrhal disease of the glands of the prostate. This affection is most often the result of masturbation. It may also be occasioned by sexual excesses of any sort, by gonorrhea, and by acute prostatitis from taking cold, which may leave behind this abnormal discharge. The discharge is very commonly supposed to be seminal in character, and may give rise to much unnecessary apprehension on the part of the patient. It should not be supposed, however, that the discharge is not significant, or the condition one which does not demand serious attention.

Treatment.—The treatment required for these cases is essentially the same as that recommended for chronic inflammation of the prostate gland. A tight prepuce bears an important relation to this disease, and when present should be remedied (see Phimosis). It is distinctly aggravated by stimulants of all sorts,— tobacco, coffee, and irritating condiments, such as pepper, pepper-sauce, cayenne, etc.

STRICTURE.

By this term is known any narrowing of the urethral canal produced either by spasmodic contraction of the muscles of the urethra, by the congestion and swelling produced by acute inflammation, or by the cicatricial contraction resulting from inflammation of the mucous membrane of the tissues lying adjacent to it. Stricture

arising from the first and second causes named is always temporary, disappearing as soon as the cause of the spasm or inflammation is removed. Obstruction of the urethral canal sometimes occurs as the result of swelling of the prostate, but this cannot properly be termed stricture. The amount of stricture varies from a very slight narrowing of the urethral canal to such a degree of narrowing as to reduce the passage to a mere pinhole. The amount of contraction generally depends upon the length of time the disease has existed, as the tendency of this disorder is to increase.

The most common seat of stricture is the back part of the canal, just in front of the membranous or prostatic portion of the organ, that part known as "the bulb." The next most frequent seat is the external orifice of some part of the canal within two inches and a half from it. It occurs more rarely in the middle portion of the passage. The term *prostatic stricture* is probably a misnomer, and the result of imperfect observations, as a real stricture is never due to enlargement of the prostate, though this enlargement may by pressure occlude the canal, and render urination impossible.

Causes.— The most common cause of stricture is inflammation arising from some form of venereal disease, usually gonorrhea. The inflammation which is the cause of stricture is also occasionally the result of injury, as from blows upon the perineum which bruise or lacerate the urethra. Inflammation is sometimes excited by the improper use of surgical instruments in the urethra. Strictures produced by mechanical injuries of this sort are the most difficult to cure.

Stricture does not usually appear immediately after the occurrence of the inflammation by which it is caused, but is the result of a gradual contraction of the canal following the inflammation, which may be going on for several years without causing sufficient narrowing to call attention to it.

In some instances, the external orifice of the urethra may be naturally too narrow. This difficulty is said to be quite frequent among the Jews, and is said to arise from the irritation caused by exposure of the glans after circumcision. This fact affords a serious objection to the indiscriminate employment of circumcision, which has been recommended by some as a preventive of venereal disorders.

Another cause of stricture, usually slight, but distinct in character, is masturbation. Stricture arising from this cause is due to the congestion and irritability of the canal set up by the practice. It begins as a spasmodic contraction of the urethra, which, if persistent, may soon become a permanent contraction. Stricture from this cause is generally located at the back part of the urethra, though it may be found at any point.

Symptoms.— The early symptoms of stricture are a slight discharge, pain behind the seat of stricture at the time of urinating, frequent urination, and change in the form of the stream, which may be twisted, divided, forked, or squirting. These changes in the form of the stream may be due to swelling of the mucous membrane near the orifice, and not to stricture, and hence do not always signify the latter condition. The act of urination is unnecessarily prolonged, and as the

stricture increases, it becomes more frequent. Great straining is required in urinating, which often results in protrusion of the rectum, and pain in the testicles, back, and lower portion of the abdomen.

In some cases, retention of the urine is the most prominent symptom. The urine usually undergoes putrefactive changes, a portion being retained in the bladder, and the bladder becomes congested, producing a catarrhal discharge, which appears in the urine as a whitish, tenacious deposit. A film is usually found on the surface, due to the presence of phosphates.

Blood is sometimes passed with the urine, particularly when the catheter is frequently employed.

Finally, the stricture becomes so tight that the urine is passed only in drops; or, a constant dribbling occurs, due to inability of the patient to empty the bladder, which becomes filled and constantly overflows. The bladder is often found greatly distended by urine; and the violent efforts to empty it sometimes result in rupture of the urethra. Great impairment of the general health often accompanies stricture, as loss of flesh, and disorders of the digestive organs, pain in the back and loins, and sometimes attacks of chilliness preceded by fever, which usually are the result of the use of the sound or catheter.

Treatment.—The proper treatment of stricture is dilatation or division. Various methods are adopted to meet the requirements of individual cases, and a great variety of instruments have been devised for this purpose. It is unnecessary to enter into a description of them, however, as these cases should be undertaken only by a skilful and experienced surgeon, and one who has had experience in their management.

PHIMOSIS.

A narrowing of the prepuce, or foreskin, so that it cannot be turned back over the glans penis, is known as *phimosis*. This condition may be congenital, or it may be the result of chronic inflammation or irritation. When the prepuce is too long, so that the secretions are retained, irritation is very likely to arise, which may ultimately result in contraction to such a degree as to almost entirely close the orifice, producing real stricture. The inflammation may be sufficiently intense to cause adhesion of the foreskin to the glans. The author has met several of these cases in men who were quite advanced in years. In one case, neglect on the part of the patient, or rather a refusal to submit to the proper treatment, resulted in death from disease of the bladder, induced by retention of the urine, and the violent efforts required to force it through the narrow opening. Besides the retention and bladder irritation which frequently result from this condition when the orifice becomes considerably narrowed, various reflex effects upon the muscular system are attributable to this condition, as partial paralysis of certain parts of the body, particularly the lower extremities. Hysteria, hypochondria, nocturnal pollutions, and even spermatorrhea, are also attributable to this cause. Sometimes the severe straining required, produces rupture, or hernia. This result is most likely to occur in cases of congenital phimosis.

Treatment. — If the contraction is not so great as to render it impossible, draw the foreskin back over the glans, and carefully cleanse the parts with a little

soap and water, after which apply a little olive-oil at first while the parts are sensitive. Retain the foreskin retracted behind the glans for a short time, and then return it. When very tight, the retention of the foreskin behind the glans for a great length of time might result in swelling so that it could not be returned, a condition which is known as *paraphimosis*. This procedure should be employed daily, and gradually the foreskin will be stretched until it can be retained behind the glans without inconvenience.

In cases in which the orifice is a little more contracted, relief may be obtained by forcibly stretching it with an instrument made for the purpose. This may be done so gradually that little or no pain will be experienced.

It is far better, however, to divide the foreskin, or in case it is much too long, to both divide it and at the same time remove a portion. This must be done by a competent surgeon. Probably this operation might be performed with great advantage in at least twenty-five per cent of all boys, and might be the means of preventing the formation of impure habits in a great number of cases.

Circumcision. — When the contraction is so great that the orifice is scarcely larger than the urethra, circumcision or a similar operation will be required. Circumcision consists in cutting off a portion of the foreskin, or prepuce. In performing the operation, the foreskin is grasped, and drawn out as much as possible, and then cut off close to the glans. The mucous membrane is then divided, and attached to the skin by stitches. This operation is by no means necessary in

all cases. In the majority of cases, simple division of the foreskin, a simple and safe operation, is all the operation required. A few stitches are placed in such a way as to retain the edges of the mucous membrane and the skin together, and healing takes place in three or four days. A certain prejudice exists against circumcision which is not altogether unjustifiable. It has been observed that the Jews who have been circumcised in the ordinary way are more subject than are others to certain forms of stricture. There is also ground for belief that the prepuce affords a needed protection to the glans. Simply slitting the prepuce is, on this account, preferable to removal, as the glans may still be protected by the closed membrane which falls over it, while at the same time there is no possible chance for constriction. In case the length of the prepuce is increased to a very abnormal degree, a portion may be removed with advantage.

PARAPHIMOSIS.

In this condition, the glans is strangulated by means of the tightness of the foreskin, which is drawn back behind it. It may be the result of inflammation or swelling of the foreskin from chancroid, or gonorrhea. Persons suffering with tight prepuce should be careful not to leave it behind the glans sufficiently long to allow swelling to occur, as by so doing the swelling may become so great that it cannot be returned. In severe cases, quite an inflammation may occur, and even destruction of the parts by sloughing.

Treatment.—The swelling of the parts should be first removed by treatment, as by applications of ice, or cloths wrung out of ice-water, or by a stream of cold water poured upon the parts. When the swelling is decreased as much as possible, which may be considered the case after employing the measures suggested for twenty or thirty minutes, an attempt should be made to bring the prepuce over the glans. To accomplish this, the penis should be grasped between the fore and middle fingers of each hand. Now bring the ends of the two thumbs against the glans, and carefully but steadily compress it in such a way as to force it through the constriction, and draw the foreskin forward. Failing in this, the following method should be resorted to:

Wet a piece of linen two or three inches in width and six inches in length. Wrap around the penis in such a way that a portion protrudes in front. Now wind around the part an elastic cord, placing the cord first around the portion of linen projecting in front of the penis. Wind the cord evenly, as thread is wound upon a spool, and quite tightly, to produce a firm compression. It should be wound slowly, so as to allow the parts to contract. Gradually carry the winding over the entire swollen portion. After retaining it in position two or three minutes, rapidly remove, and if the swelling is not sufficiently reduced, apply the cord again before it has time to return. By so doing, the swelling can be gradually brought down until the prepuce may be readily restored by the fingers used in the manner already described. If the last method fails, a surgeon should be consulted, who will, if necessary, divide the foreskin at the point of constriction.

BALANITIS.

From neglect to cleanse the parts in cases of gonorrhea, and in some instances from the irritation of the urine when the prepuce is long, the mucous membrane lining the foreskin and covering the glans sometimes becomes the seat of an acute inflammation, known as *balanitis*. This disease is liable to occur in persons who have a long and rather tight foreskin.

The symptoms are a severe itching or burning in the region of the glans, sometimes attended by erections and great sexual excitement. The foreskin is reddened and swollen, sometimes very greatly. A considerable amount of yellowish or whitish discharge occurs, which has a very disagreeable odor.

Treatment.—The most essential measure of treatment is simple cleanliness. The parts should be carefully cleansed with soft water, and soap may be added, after which a little linen or lint dipped in simply cold water or in lime-water may be placed between the foreskin and the glans. If there is much secretion, a solution of zinc, alum, or tannin, consisting of half a dram to the pint of water, should be applied to the affected surfaces each day, after careful cleansing, and the lint placed between the prepuce and the glans should be kept saturated with the same solution. If the foreskin is so tight that proper cleansing of the parts cannot be effected, the opening should be increased by stretching. This may be accomplished by means of a sponge tent,— a piece of sponge which has been dried under pressure, or by the use of an instrument for the purpose. If the trouble is not relieved by the means suggested, a physician should be consulted.

Chronic inflammation of the foreskin may result in thickening and contraction, by which the orifice of the prepuce becomes very small, and the tissues acquire almost the consistency of gristle. In cases in which the inflammation is intense, the prepuce becomes attached to the glans. These cases, of course, require a surgical operation.

HERPES OF THE FORESKIN.

This disease is characterized by the appearance of small blisters upon the mucous membrane of the foreskin. There is usually intense redness, considerable swelling, and much itching or burning.

Treatment. — The disease usually lasts but a few days, and a speedy cure may be effected by taking care to keep the parts thoroughly cleansed and protected from friction. A lotion of zinc or alum, three or four grains to the ounce, may be employed three or four times a day with advantage. Dry powders, as starch to which oxide of zinc or tannin has been added in proportion of ten grains to the ounce, may often be used to better advantage than lotions.

VENEREAL WARTS.

The so-called venereal warts are persistent growths which sometimes form upon the glans or the foreskin, the character of which, however, does not differ from that of warts appearing upon other parts of the body. They are simply papillary growths, the characteristic appearance of which is due to the peculiarity of the tissues from which they grow. They are not

really venereal in character, as they sometimes occur in persons who have never been exposed to any venereal disease. They usually come from the irritation resulting from an ichorous discharge, and are of course favored by the discharges present in venereal diseases. They are, however, thought to be contagious.

Treatment. — The growths must be destroyed by the galvano-cautery, or by strong caustics. They are very apt to return, sometimes requiring removal several times to render the cure permanent. After removal of the warts, the parts should be kept dry and free from irritating discharges.

INFLAMMATION OF THE TESTICLE, OR ORCHITIS.

Inflammation of the entire testicle is comparatively a rare disease, though its occurrence is sufficiently frequent to deserve mention here. The inflammation may be either acute or chronic.

Acute inflammation of the testicle may result from a blow or a cold, though it most frequently occurs in cases of mumps, particularly about the conclusion of the disease. It occurs about twice in every hundred cases of mumps. It most frequently appears in boys who are about the age of puberty. The whole testicle may be involved, or only that part known as the *epididymis*. Recovery usually occurs without injury to the organ, except that it is liable to subsequent attacks, though quite frequently the inflammation is followed by atrophy, or shrinking of the testicle.

Orchitis not infrequently results from injury or from exposure to cold. Cavalrymen and bicycle riders

sometimes suffer in consequence of bruising the testicle by pressure against the saddle. When such an accident occurs, the parts should receive immediate attention. The patient should lie down, apply a hot fomentation over the affected parts for ten or fifteen minutes to relieve the pain; then cloths wrung out of cold water and renewed as soon as they are slightly warmed,—that is, every four or five minutes,—should be applied for several hours. On getting up, the patient should apply a suspensory bandage, and the fomentations and compresses should be renewed every night, and, if necessary, in the morning. Prompt attention of this sort will often prevent the loss of the testicle, and the great pain and inconvenience which accompany acute inflammations of this sort.

Epididymitis. —A disease known as epididymitis, or inflammation of the epididymis, so closely resembles inflammation of the testicle that it is not likely to be distinguished from the latter; and as the two diseases are treated in the same manner, they will be considered together. This disease is much more serious in character, as permanent damage may be done by obstruction of the seminal ducts, which pass through the epididymis. The occurrence of this disease in both testicles is likely to result in sterility through obstruction of the seminal ducts.

Symptoms. —The chief symptom of inflammation of the testicle is swelling of the parts, accompanied by pain. This symptom is sometimes preceded by pain in the groin, which may extend to the perineum, buttocks, and front of the thighs. The testicle is tender as well as swollen, the tenderness often extending into

the groin. The pain is of a peculiar sickening character. Pain in the back is also a prominent symptom. After a time, the skin of the scrotum becomes red and tense, if the swelling continues. When the inflammation subsides, some tenderness and considerable swelling are usually left. This generally disappears in a few days, but sometimes the testicle remains enlarged and hardened. By proper treatment, however, these results are not likely to occur.

Treatment.—As soon as the patient discovers pain in the groin and tenderness along the spermatic cord, he should immediately go to bed, and remain there until the pain and soreness have subsided. If this course is pursued, together with the treatment which will be directed, the disease may disappear in a few hours, though it is not impossible that it may continue several days. Imprudence at the start is likely to prolong the malady for several weeks, and ultimately occasion the loss of the testicle. A hot pack, vapor bath, hot-air bath, electric-light bath, or some other form of sweating bath in which the patient may recline, should be taken at the outset. The patient should be wrapped in woolen blankets after the bath, and carefully protected from chilling. As soon as active perspiration begins, the pain, which is sometimes quite severe, will usually subside.

The diet should be very light, consisting chiefly of fruits, grains, and milk. The bowels should be kept open by copious enemas daily. If necessary, a little salt or soap may be added to the water to secure thorough defecation. The testicle should be supported by means of a broad bandage pinned around the thighs

at just the proper point to allow the scrotum to rest on the upper side.

Hot fomentations, as hot as can be borne, should be applied to the affected parts and the groin on the same side, for ten minutes every hour. On removing the fomentations, immediately apply cloths wrung out of ice water, ice compresses, or ice packs. If compresses are used, the cloths should be changed every two minutes, or sufficiently often to prevent their becoming warm. Bags filled with ice water are much better. They should be placed in such a way as to avoid pressure upon the testicle, but should envelop it well. It is necessary to have two or three, so that the fresh one can be placed in position while the other is being refilled with ice. The cold applications should be continued, except when the fomentations are applied, until the inflammation is subdued, which will be indicated by relief from pain, heat, tenderness, and swelling. After this has been accomplished, the absorption of the swelling between the coverings of the testicles may be hastened by continuous application of cloths wrung quite dry out of cold water, covered well with flannel. The application should be renewed every two hours, until the pain and swelling are greatly relieved. The applications may then be renewed at night for some time, after the patient gets on his feet, by this means preventing a relapse.

In very severe cases of orchitis, the ice bag may be used in conjunction with the hot blanket pack, as described for the treatment of acute prostatitis.

If the disease continues several days, hot baths should be administered as often as every other day.

The application of fomentations to the back will afford great relief from pain.

If the treatment suggested is followed closely, the patient will suffer little pain, and the disease will be rapidly controlled.

HYDROCELE.

This affection consists of an accumulation of fluid between the coverings of the testicle. The fluid consists of the natural secretion of the membrane greatly increased in quantity. The disease is usually the result of blows or mechanical injuries of some sort, though it sometimes occurs without apparent cause. The amount of fluid rarely exceeds a pint and a half, and is generally much less, although the historian Gibbon is said to have had a hydrocele which held six quarts. The disease frequently occurs in infants as well as adults.

Symptoms.—The difficulty is easily known by its peculiar appearance. The mass is tense, smooth and generally pear-shaped, the large extremity downward, is very tense, and when viewed with a bright light on the opposite side from the eye, is semi-translucent.

Treatment.—The fluid may be very easily drawn off by simple puncture with a trochar. This treatment is all that is needed in small infants, as the fluid does not usually return; but in adults, it is very certain to refill. External applications have no curative advantages. A radical cure may sometimes be effected by producing inflammation of the walls of the sack

sufficient to cause it to adhere. This is done by the injection of a small quantity of iodine or other irritating substances, after the fluid has been removed. The remedy named is less likely to produce violent inflammation than the various other irritants which are sometimes used for the same purpose. The most satisfactory method of treating this affection is the removal of the secreting membrane. It is not necessary that the entire membrane should be removed, but it is only necessary to take away a sufficient amount of the secreting surface so that the lymphatics may be able to take care of the diminished secretion properly. When done with antiseptic precautions, the parts heal quickly, and the operation is permanently successful. A person suffering with this disorder should place himself in the hands of a good surgeon.

IRRITABLE AND NEURALGIC TESTICLE.

Irritability and tenderness of the testicle is likely to occur about the period of puberty, when special development occurs. The tenderness may be such that a slight touch or the friction of the clothing in walking produces pain. There is no swelling or appearance of inflammation. The difficulty is sometimes present in epilepsy. It is usually the result of self-abuse or prolonged sexual excitement from lascivious thoughts. In these cases, pain frequently extends to the limbs and back, and may be attended with nausea and much distress. There is also occasional swelling of the testicle in cases of the latter class. The pain is sometimes so great, especially where the patient has been addicted to self-abuse, that he begs to have the organs removed.

Neuralgia of the testicle is due to the same causes which produce neuralgia in other parts of the body. It is very liable to occur in persons suffering from inactivity of the liver, and disorders of digestion, or constipation of the bowels, especially when the patient has been addicted to the habit of self-abuse or sexual excesses of any kind.

Treatment.—In young boys, the difficulty will usually be removed by the application of the wet compress at night. In some cases, hot fomentations to the parts, night and morning, and occasional hot sitz baths, will be required. Attention should be given to the general health by the regulation of the diet, exercise in the open air, etc.

Measures should be taken to discover the cause, which should be promptly removed. No good can come from treatment so long as the patient indulges in erotic thoughts, or while the bowels are constipated, or other active causes are in operation. When on the feet, the testicles should be supported by a suspensory bandage. This is of particular advantage when a varicocele is present, which often gives rise to a great amount of pain and discomfort. A sitz bath should be taken daily, or every other day, at a temperature of 105° to 110°. Instead of the sitz bath, the parts may be bathed with hot water morning and night, either by pouring water upon the parts from a dipper, or immersing in hot water in a bowl.

The diet should be unstimulating. Flesh food should be disused, and condiments, tobacco, and stimulating drinks should be avoided. If the patient is strong, sweating baths should be taken once or twice

a week, and the diet should be spare. The bowels should be kept open by an abundant use of fruits and, if necessary, by the employment of the cool enema. The removal of the testicles, as practiced by some English surgeons, is unnecessary. Removal of the cause is a much more rational plan.

ATROPHY, OR SHRINKAGE OF THE TESTICLE

Atrophy of the testicle, as indicated by a softening or diminution in size, is sometimes the result of inflammation, though it is much more frequently the result of masturbation or excessive venery. It never occurs as the result of abstinence from sexual indulgence. Softening or destruction of the organ is often the result of varicocele. It should be said that considerable softening may occur without entire destruction of the organs, or total loss of sexual power.

VARICOCELE.

Varicocele, or a varicose condition of the spermatic veins in the scrotum, is a very frequent affection, being found in about one of every ten adult males. The enlargement may be accompanied by a chronic inflammation, causing thickening of the walls. The mass of enlarged veins sometimes assumes so great size as to entirely conceal the testicle, causing the affected side to become several times larger than the other. The disease usually begins at about the age of eighteen or twenty. It is often unnoticed for some time, generally until the swelling becomes so great

as to attract attention, when it may be mistaken for hernia. It may be distinguished from the latter condition by the peculiar feeling of the mass of veins, which produce, when pressed between the thumb and finger, the sensation of a mass of worms, somewhat sensitive, disappearing when the patient lies down. On rising, the veins begin to fill, and the swelling reappears, beginning first near the testicle. By this means it can be distinguished from hernia, in which the enlargement begins above, at the body, increasing downward as the intestine protrudes more and more. Varicocele most frequently occurs in the left side.

Varicocele is usually accompanied by more or less pain and inconvenience. There is frequent pain, not only in the testicle, but in the groin. If not actual pain, there are constant dragging sensations, especially after or during active exercise on the feet, and particularly during hot weather, which render the patient very uncomfortable. There is also, frequently, pain in the back.

The most common causes are straining at stool from constipation of the bowels, and long walking or standing. It is most likely to occur in persons who have been addicted to the habit of self-abuse or sexual excesses of any sort.

Treatment.—Slight cases require simply suspension of the parts by means of a scrotal suspensory bandage, which consists of a sling or bag, supported by a waistband. There are numerous varieties of these supporters made, many of which are worthless. It is important that the support should be of such a character as to produce no discomfort; but it should

at the same time be firm enough to afford sufficient compression to empty the dilated veins.

Cold bathing of the parts will do much to overcome the relaxation of the scrotum which is always found in these cases, and it will be found particularly useful in hot weather, when the parts are naturally more relaxed.

In bad cases, those in which the varicocele is very large, or in which the patient suffers great discomfort or inconvenience from the pain, which is not removed by the scrotal supporter, and in cases in which wasting of the testicle is occurring in consequence of the disease, more radical measures should be employed. The only means of radical cure is a proper surgical operation.

The best operation is the removal of a portion of the vein. This may be accomplished through a very small incision made with antiseptic precautions. In the hands of a good surgeon the operation is perfectly safe and permanently remedies the difficulty.

PRIAPISM.

Very frequent or persistent erections are frequently the result of abnormal irritability of the controlling centers of the brain and spinal cord. This condition is known as *priapism*. It may result from injury to the back of the head. Lallemand relates the case of a patient who was able to produce not only erection, but ejaculations by simply striking his head with his knuckles. Extreme cases in which the erection is almost constant and painful, are much more rare than

those in which the erections occur on slight provocation, as the friction of the trousers in walking or riding. Irritation of the prepuce, constipation of the bowels, and irritability of the spine, arising from any source, are among the most common causes of this condition. To this must be added the condition of irritable weakness of the organs, which is the common result of sexual excesses, especially self-abuse. There is commonly found in these cases an irritable condition of the prostate, and frequently of the whole urethra.

Treatment.—The cause must be removed. Exciting foods of every kind must be avoided. The mind must be kept free from every lascivious thought. A warm sitz bath (94° to 100°, duration 15 to 30 minutes, or longer) may be taken with advantage daily, or even twice a day. Hot fomentations, applied over the lower portion of the spine, is a useful measure which will commonly afford relief. To these measures should be added all such as will improve the general health.

ABNORMALITIES OF THE TESTICLES.

The testicles are developed in the abdomen, usually descending into the scrotum a short period before birth. In occasional cases, one or both testicles do not descend into the scrotum at this time, but remain either permanently or for a short time in the abdominal cavity. This accounts for the fact that men are sometimes the fathers of children, although they apparently have no testicles. It should be stated, however, that a man whose testicles are in this condition, is likely

to be sterile. The sterility is not due to the abnorma position of the organ, but to the fact that a retaine testicle is likely to be imperfectly developed. Th author has met a few cases in which one testicle wa sometimes in the scrotum and sometimes in the abdc men, the patient having the power to draw it up int the abdominal cavity at will.

Occasional cases occur in which an extra or super numerary testicle is found. In most cases, howeve what appears to be a third testicle is but a cystic fibrou growth. The testicle is sometimes misplaced, and i occasionally found in the perineum. Cases of super numerary testicle require no treatment.

IMPOTENCE.

Impotence is usually the result of sexual excesses Probably the most frequent cause is abnormal sexua indulgence, particularly self-abuse. When begun earl in life, and continued to a greater or less extent whil the body is developing, and before the sexual organ are fully matured, a period during which this portio of the body should be wholly free from excitement, th sexual powers are almost certain to be more or les weakened, though in some individuals a great amoun of indulgence seems to be tolerated without producin impotence.

The first symptom usually noticed by an individ ual whose sexual powers are weakening, is too earl ejaculation in the sexual act. As the disease advances a partial loss of sexual power soon follows. The pri mary cause of this symptom, which ultimately lead

to total loss of sexual power, is exhaustion of the nerve centers of the spinal cord, which control the sexual organs. This is the atonic form of impotence, which is by far the most common of all the forms of this humiliating disease. In this class of cases, there is often found a sensitive condition of the urethra. Sometimes there is a numbness or lack of sensibility in the skin of the penis or scrotum, or of some other portion of the organs.

Impotence is sometimes only a symptom of other diseased conditions of the body. It is frequently an accompaniment of dyspepsia, various forms of paralysis, spinal irritation, diabetes, and Bright's disease of the kidneys. Disease of the testicles is productive of the most complete and hopeless of all forms of impotence.

Treatment.—There is no specific treatment for impotence, and the only general principle which can be laid down is that the immediate cause, whatever it may be, must be removed. If the local weakness is due to general debility or disease, the causative malady must of course receive immediate attention. In these cases, no local measures of treatment may be necessary, though usually a cure may be hastened by the employment of the proper local remedies. If the sexual weakness is due to an abnormal irritability of the urethra, this should receive such treatment as has been elsewhere indicated.

Cases of impotence arising from spermatorrhea or general nervous debility should be treated according to the directions given for the management of these disorders. Fomentations, alternate hot and cold appli-

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cations, and the hot pour to the spine, are often found to be of very great service in cases of this sort. Alternate hot and cold sponging of the parts, especially when the patient complains of numbness and coldness of the organs, is a very useful measure.

We should not neglect to warn those who are suffering in this way of the danger which is likely to result from the use of the various aphrodisiacs which are so commonly recommended by physicians to persons whose sexual powers show evidence of failure. These artificial stimulants sometimes arouse the sexual organs to an abnormal activity for a brief time, but only to produce ultimately an exaggeration of the exhaustion and debility. When symptoms of loss of sexual power occur, the patient should understand that the sexual organs have become weakened, and demand rest, and he should abstain wholly from all excitement of the organs through mental influence or otherwise. In the majority of cases, a sufficiently prolonged rest will give the organs opportunity to recover their natural tone, especially if the measures of treatment above recommended are faithfully carried out. In some cases, however, the disease is so obstinate that it demands the best efforts of the most skilful physician. Those who seek medical advice for relief of this disease should be careful to avoid the great army of quacks who set many traps and pitfalls for the unwary young man who believes himself to be threatened with a loss of sexual power, or impotence. These charlatans reap a rich harvest from the fears and easy gullibility of this class of patients.

It is unquestionably true that quite a large pro-

portion of the cases who seek medical advice for the cure of impotence, are suffering from morbid fears. The patient, knowing that he has been guilty of excesses, imagines that he has become impotent, and thereby really makes himself so. These cases can be cured by proper medical advice. The fact that they exist should not lead physicians to consider that nearly all cases are the result of this condition, as there are probably very few cases of so-called psychic impotence in which there is not real weakness of the sexual organs; and there is in the majority of cases a prostatic irritability which should be removed by proper treatment.

STERILITY.

This condition, while it is much less common in man than in woman, is undoubtedly much more frequent in the male sex than is generally supposed. It has been estimated by reliable authorities that in cases of sterility occurring in married couples, the fault is with the man in about one in six cases. The most common causes of sterility are the following: Non-development of the testicles; disease of the testes, as chronic inflammation, or the results of acute inflammation; absence of the testicles; deformity or obstruction of the vas deferens or some portion of the seminal ducts; diseased seminal fluid; catarrhal or bloody discharge, usually the result of disease of the vesiculæ seminales; too frequent sexual indulgence, causing deterioration of the seminal fluid which may exist even to the extent of the entire absence of spermatozoa;

frequent seminal losses; prostatorrhea, or catarrh of the prostate; aspermatism, or absence of spermatozoa; non-ejaculation; consumption; syphilis; disease of the brain and kidneys; neurasthenia, or general nervous debility.

Treatment.—The treatment of sterility requires a high degree of skill and experience, and hence cases of this sort should only be undertaken by a competent physician. The skilful physician will first seek to remove the causes of the disease, when they are of such a character that they can be removed by remedial means.

CASTRATION.

The operation for the removal of the testicles is known as *castration.* This operation was practiced among Eastern nations in ancient times, especially in the household of kings, who required the officers employed in their households to submit to it—a cruel custom, which fortunately is not in vogue at the present time. During the Dark Ages, young men who were employed as singers in the religious services of the cathedrals were usually subjected to this operation for the purpose of preserving the high-keyed tone of their youthful voices. The effect of the operation, when performed before puberty, is to prevent those changes which naturally occur at that time. When performed after the body has attained maturity, the operation does not materially affect the individual's physical appearance, although certain mental changes, particularly the tendency to effeminacy, have sometimes been observed.

CIRCUMCISION.

This is an operation which has been practiced by the Jews from the earliest times, and has also been in vogue among several Eastern nations from time immemorial. This operation is usually performed by cutting off a portion of the foreskin, or prepuce. It is often necessitated by a redundancy or tightness of the prepuce. Observations made among the Jews have shown that circumcision occasions a narrowing of the external orifice of the urethra, in consequence of which some of the unpleasant results of stricture may be produced. This is due to the prolonged irritation present during the healing of the wound when performed upon young infants in the usual way. Simply slitting the prepuce is all that is necessary to obviate danger of constriction and to prevent an accumulation of secretion.

How to Bathe

IN water, nature has supplied us with one of the most efficient means of aiding her in the restoration of the sick to health, as well as one of the greatest necessities of life. Properly used, this remedial agent is capable of accomplishing more for a person suffering with the special maladies described in this work, than any other one remedy, or than all the drugs offered by the entire *materia medica* combined. It is possible, however, that this beneficent agent may do harm as well as good, and hence it is important to know how to employ it in a rational and scientific manner.

General Rules for Bathing.—The following general rules apply to nearly all baths of every sort:

1. A full bath should never be taken within two or three hours after eating.

2. Always, if possible, employ a thermometer to determine the temperature of the bath.

3. The temperature of the room during the bath should be 75° to 85°.

4. Aged people should never take very cold or very hot baths.

5. Never take a cold bath when exhausted or chilly.

6. A hot bath should always be followed by an application of water at a lower temperature, to tone the skin.

7. Always drink freely of water just before a warm bath.

8. It is usually best to wet the head before a bath.

9. Always be careful to dry the skin thoroughly after a bath.

10. The body should be rubbed with sufficient vigor after each bath to secure a good reaction, and to prevent a feeling of chilliness.

11. After a cool bath, exercise until well warmed.

12. After a warm bath, rest for an hour or so.

Sponge or Towel Bath.—The sponge or hand bath is the simplest and most useful mode of applying water to the surface of the body, for it requires the use of only such appliances as every one possesses, and it can be employed by any one without elaborate preparation, and under almost any circumstances. A great quantity of water is not required; a few quarts is a plenty, and a pint will answer admirably in an emergency. A soft sponge, or a linen or cotton cloth, and one or two soft towels, or a sheet, are the other requisites. The hand may be used in the absence of a cloth or a sponge for applying the water. A mitt of coarse cloth is still better.

The temperature of the bath should not be above 95°, and 90° is generally better. Most people can habitually employ a temperature of 75° to 80° without injury. A lower temperature is powerfully tonic when well borne.

Begin the bath by wetting the head. Bathe the face, then the neck, chest, shoulders, arms, trunk, and back. Rub vigorously until the skin is red, to pre-

vent chilling; for even when the temperature of the room is nearly equal to that of the body, the rapid evaporation of water from the surface will lower the external temperature very rapidly, unless a vigorous circulation is maintained.

After thoroughly bathing the upper portion of the body, turn the attention to the lower portion, continuing the rubbing of the upper part at brief intervals, to prevent chilliness. As soon as the bathing is concluded, envelop the body in a sheet, and rub dry, or dry the skin with a towel. When the surface is nearly or quite dried, rub the whole vigorously with the bare hand.

The bath should not be prolonged more than ten or fifteen minutes. Five minutes is sufficient to secure all the benefits of the bath, and even three minutes will suffice for a very good bath.

Persons who chill easily will find it better to bathe only a portion of the body before drying it. Some will even find it necessary to retain a portion of the clothing upon the lower part of the body while bathing and drying the upper part.

Weakly patients may receive this bath with very little disturbance, even in bed. Only a small portion of the body should be uncovered at a time, being bathed, dried, rubbed, and then covered while another part is treated in a similar way.

The sponge bath may be administered anywhere without danger of soiling the finest carpet, by taking care to make the sponge or cloth nearly dry before applying it to the body. A rug may be spread upon the floor as an extra precaution. When used for clean-

liness,—as it should be daily, or at least two or three times a week,—a little fine soap should be added two or three times a week, to remove the oily secretion from the skin.

This bath is applicable whenever there is an abnormal degree of bodily heat, and in such cases may be applied every half hour without injury, and even more frequently. It is useful in cases of nervousness and sleeplessness, in chorea and *laryngismus stridulus,* also in that curious affection of children known as "catch in the breath." In fact, whenever water is required in any form, this bath may be used with advantage, the temperature being suited to the case. Sponging with water as hot as can be borne will often relieve for several hours the profuse sweating of consumptives. Hot sponging of the face, neck, and head is useful in relieving the headache of catarrh and influenza, and in stopping nosebleed.

For a saline sponge bath, add a tablespoonful of salt to each quart of water employed in the bath.

Full Bath.—For this bath, a tub is required the length of the body, about eighteen inches deep, two feet wide at the top, and, preferably, six inches narrower at the bottom. It is better to have the end intended for the head a little elevated. Place in the tub sufficient water so that the patient will be entirely covered, with the exception of the head, when he lies upon his back. During the bath, the body should be vigorously rubbed by the bather or an attendant, or both, particular pains being taken to knead and manipulate the abdomen in a gentle but thorough manner. The temperature of the bath, when taken for cleanliness

or for its soothing effects, should not be higher than 95° to 98°, and it should be cooled to about 85° or 90° just at the conclusion of the bath, by the addition of cool water.

Very cold baths are used by some, especially in Germany, in the treatment of fevers, so low a temperature as 60° F. being often employed. The most approved mode, however, is what is called the graduated bath, in which the temperature is gradually lowered until the desired effect has been produced.

When used to excite the action of the skin, a hot bath should be employed. Begin the bath at 98° or 100° F., and gradually raise to 108° or 110°, continuing for ten or fifteen minutes. Then remove the patient, wrap him in blankets, and let him remain sweating half an hour to an hour.

Every family ought to possess conveniences for a full bath. Indeed, it is now found in every well-regulated house in our large cities. It is not so expensive but that any man can have it. Portable baths of rubber may be obtained, which are worth many times their cost. A stationary bath may be made of wood, of the dimensions given, and lined with lead or zinc. There should be an opening in the lower end for withdrawing the water.

The full bath is one of the most refreshing of all baths, being also one of the pleasantest. Employed at a low temperature, it is a powerful means of reducing excessive heat in fevers. The hot full bath very greatly relieves the pain of acute rheumatism, colic, gallstones, and sciatica, and is almost a specific for colds, if taken soon after their contraction and just before retiring.

Very hot and very cold temperatures are very hazardous with this bath, since it involves so large a portion of the body. Such extremes are rarely useful in any case, and should be used only under the eye of a physician. We have found that the cold bath is very much better borne if the patient is well anointed with vaseline before being placed in the water. The effects are diminished.

Sweating Pack. — Wrap the patient in woolen blankets. Place to his hands, sides, thighs, and feet, hot bricks, or jugs filled with hot water, wrapped in moist flannels. Glass bottles or jars filled with hot water and covered with wet stockings, are very convenient. Give frequent and copious drafts of hot water or some simple tea, as peppermint or wintergreen, or some similar drink. Keep the head cool by tepid compresses. In a few minutes, most copious perspiration will be produced. After the bath, treat as after a pack. This is useful in all cases in which powerful action of the skin is desirable, as in chronic rheumatism, obesity, jaundice, etc. It is one of the most excellent means of curing a cold.

The Vapor Bath. — As a remedial agent, water in the form of warm or hot vapor is scarcely less useful than in its ordinary form. The vapor bath can be readily and successfully administered with such conveniences as every family possesses. Place the patient in a cane-seated chair, having first taken the precaution to spread over the seat a dry towel. Surround the patient and the chair first with a woolen blanket, and then with two or three thick comfortables, drawing the blankets close around the neck, and allowing them

to trail upon the floor so as to exclude the air as perfectly as possible. Now place under the chair a large pan or pail containing two or three quarts of boiling water. Let the blankets fall quickly, so as to retain the rising vapor. After a minute or two, raise the blankets a little at one side, and carefully place in the vessel a very hot brick or stone, dropping the blankets quickly, to avoid the admission of cold air. Before the first brick or stone has cooled, add another, and so continue until the patient perspires freely. The amount of perspiration must be judged by the face and forehead, as much of the moisture upon the skin beneath the blankets is condensed steam.

Should the bath become at any time too hot, a little air may be admitted by raising the bottom of the blankets a little, being careful to avoid chilling the patient in doing so. The bath should seldom be continued more than half an hour, and fifteen to twenty minutes will usually accomplish all that is desired by the bath. If too long continued, it produces faintness. A too high temperature will be indicated by a strongly accelerated pulse, throbbing of the temples, flushed face, and headache. The head should be kept cool by a compress wet in cool water and often changed. The temperature of the bath should be from 100° to 115°. Unpleasant effects are sometimes produced at 120°.

After this bath, apply the tepid sponge or full bath. No time should be allowed to elapse after the blankets are removed before the concluding bath is applied, as the patient will easily chill. He should not be allowed to become chilly by exposure to cool air before the

application of the spray, douche, or other bath, which should be followed by vigorous rubbing.

For "breaking up a cold," "breaking chills," relieving rheumatism, soreness of the muscles from overexertion, and relaxing stiffened joints, this is a valuable agent. It may also be used to advantage in chronic diseases in which there is inactivity of the skin, liver, or kidneys, being a powerful diaphoretic; but great care must be exercised to avoid excessive use, as too frequent repetition of the bath produces debility.

This is a milder application than the hot-air bath, unless employed at a high temperature, 120° or more, when it becomes more severe.

In an institution where the bath is a daily necessity, a permanent arrangement for giving the bath is generally employed. It usually consists of a box in which the patient sits upon a stool, his head being allowed to remain outside by means of a suitable opening. A wet towel is placed around the neck, to prevent the steam from rising about the head.

Steam may be generated by boiling water in a box with a large spirit lamp or a gas burner, or it may be conducted into the bath by a rubber tube connecting with a tight boiler.

After this bath, a little cold water should be dashed over the body to tone up the skin; or if continued sweating is desired, the patient should be wrapped warmly in bed, with woolen blankets next to the skin.

Hot-Air Bath.—In administering this bath, prepare the patient precisely as directed for the vapor bath. Instead of placing under the chair a vessel of hot water, place a large alcohol lamp or a small dish

containing a few ounces of alcohol. When all is ready, light the lamp or alcohol, and carefully exclude the air. It is hardly necessary to suggest the propriety of putting the lamp in such a position as to insure safety from fire. If alcohol is used in an open dish, it is important to wipe the outside of the vessel quite free from any trace of alcohol, as otherwise it might be communicated to the floor or carpet. Also avoid spilling the alcohol in putting the lamp or dish in place, for the same reason. It is a wise precaution to put the lamp or dish in a plate or shallow dish containing a little water. The hot-air bath should be conducted in the same manner as the vapor bath; but the patient will bear much higher temperatures, as air is a much poorer conductor of heat than vapor. A heat of 130° to 160° F. is not at all disagreeable to the patient. It should be followed by a cooling bath, as directed for the vapor bath. When perspiration is not readily produced by the hot-air or Turkish bath, the patient should be given a hot full bath from three to five minutes, and then again exposed to the hot air, when perspiration will quickly start. The vapor bath may be used for the same purpose.

This bath is useful for all cases in which the vapor and Turkish baths are recommended, and is most convenient for use in families, as it can be improvised so readily. It cannot be excelled as a diaphoretic, and is an excellent means of eliminating the poison of malaria, syphilis, and hydrophobia. An English naval surgeon reported through the *British Medical Journal,* a year or two ago, a large number of cases of syphilis successfully treated by the hot-air bath, combined with a careful diet.

The Oil Bath.—The oil bath was much employed by the ancients in connection with the Roman and Turkish baths. It consists in rubbing the skin very thoroughly with some unctuous substance. Olive oil may be employed, but cosmoline and vaseline, refined products of coal oil, are much used, and are preferable. Olive oil cannot be obtained pure except at almost fabulous prices. That sold in the drug stores as olive oil is really cottonseed oil, and mixtures of lard with various other vegetable oils. We have found pure refined cocoanut oil to be the best of all for this purpose.

A warm bath should be first administered. Then dry the patient as usual, and apply the unguent, taking care to rub it in thoroughly. Simply greasing the surface is not the object sought. The skin and flesh should be worked, rubbed, and kneaded, until the oil nearly disappears from the surface. The skin should then be wiped clean with a soft cloth.

The object of this application is to supply the place of a defective natural secretion of oleaginous material, to increase the activity of the skin, and to diminish the susceptibility to cold. How this is accomplished readily appears. The oil is a simple substitute for the sebaceous secretion, which is, in certain classes of diseases, notably deficient. The thorough manipulation of the skin which is necessary in applying the oil, and which is facilitated by a lubricant, directly promotes cutaneous activity. Whether the oil itself has any direct effect in increasing functional activity of the skin, cannot be positively affirmed, although it is reasonably supposable that the skin would act more

nearly normal when a deficient element is supplied than when it is wanting. Recent experiments show that the skin radiates heat faster when varnished or anointed, and this may account in part for the warming effect of the oil bath, as also for the protection it affords against taking cold after warm baths.

Sitz Bath.—The sitz bath, also known as the hip bath, is one of the most useful baths employed in hydropathic treatment. Its utility was fully recognized by the early practitioners, who sometimes kept their patients so long in the bath that they became almost literally water-soaked, and were so numb from the continued application of cold water as to possess almost no external sensibility. It is said in some cases the skin could be rubbed off in attempts to gain a reaction, without the patient's knowledge.

For this bath, a common washtub may be used, by placing a support under one edge to elevate it one or two inches; but it is better to use a tub made for the purpose, which should have the back part raised eight or ten inches higher than the front, to support the back, the sides gradually sloping so as to support the arms of the bather. The bottom should be elevated two or three inches. The depth in front should be about the same as that of a common washtub.

Enough water is required to cover the hips, and extend a little way up the abdomen; four to six gallons will suffice. Any temperature may be employed, being suited to the condition of the patient. The duration of the bath will also vary according to the condition of the patient. A short, cool bath (two to five minutes) is tonic in its effects, like all short, cool

applications; a more prolonged one (eight to twenty minutes) is a powerful sedative. The hot sitz is very exciting in its effects, if long continued. The warm bath is relaxing. The hip and trunk should be well rubbed during the bath by the patient or an attendant. The bather should be covered with a sheet or blanket during the bath. If sweating is desirable, use several blankets.

A good plan for administering it, and one which will be applicable to most cases, is this: Begin the bath at 92° or 93°. If a thermometer is not at hand, pour into the bath-tub three gallons of fresh well or spring water, and then add one gallon of boiling water. This will give the desired temperature. After the patient has been in the bath ten minutes, cool it down to 75°, which may be done by adding two gallons of well water. Continue the bath ten minutes longer, then rub the whole body vigorously with the wet hand, and wipe dry.

The sitz bath is useful for chronic congestion of the abdominal and pelvic viscera, diarrhea, piles, dysentery, constipation, and genital and urinary disorders. It is very valuable in many nervous affections, especially those which involve the brain, as cerebral congestion and hyperemia. There is no better remedy for a cold than a hot sitz bath taken while fasting and just before retiring. It should be continued until gentle perspiration is induced.

Wet Girdle.—This was a favorite remedy with the early German hydropathists, and it is a very useful appliance when properly employed, though it has been much abused by excessive use. To apply it well, a

coarse towel three or four yards in length is most convenient for use. Wet one-half of this in tepid water, wring it until it will not drip, and apply it to the abdomen, placing one end at the side and bringing it across the front first, so that two thicknesses of the wet portion will cover the abdomen. After winding the whole closely around the body, fasten the ends securely with pins or with tapes attached for the purpose. Then cover with two or three thicknesses of dry flannel. For feeble persons, it is better to wet only that portion of the towel which covers the abdomen. This is a very efficient remedy for constipation, chronic diarrhea, and most intestinal disorders. It is equally valuable in dyspepsia, torpid liver, enlarged spleen, and uterine derangements.

The Enema.—Fecal accumulations in the lower bowel are more quickly and easily removed by an enema of warm water than any purgative, laxative, or cathartic ever discovered or invented; and the use of this remedy is not accompanied by the unpleasant and painful griping and tenesmus which often attend the use of cathartics. The administration is a trifle more troublesome, but the results are enough superior to more than repay the inconvenience. The siphon or fountain syringe is far preferable to any other for administering injections. Water about blood-warm should be used for the purpose of relieving constipation, and a considerable quantity—one to three pints, or more—may be used. The water should be retained for a few moments while the bowels are kneaded and shaken. If there is difficulty in retaining the enema, a folded napkin may be pressed against the anus.

In hemorrhage and inflammation of the lower bowel, cool or cold clysters should be employed, and should be retained as long as possible. The copious cool enema is a valuable antiphlogistic remedy used in conjunction with the cool bath in cases of violent febrile excitement, as typhoid fever, when the temperature rises above 103° F. It is also useful in certain cases of spermatorrhea.

The enema is a most perfect substitute for purgatives in general. Cases are very rare in which a cathartic drug will be found necessary if the enema is properly used, but the enema may become a source of mischief if abused. If habitually relied upon to secure a movement of the bowels for a long time, the bowels lose their activity, and the most obstinate constipation sometimes results, precisely as from the prolonged use of purgatives.

Compresses. — The compress is a wet cloth or bandage applied to a part. The object may be to cool the part under treatment, or to retain the heat. The compress may be used with equal success in either case. When the part is to be cooled, a compress composed of several folds should be wet in cold or iced water, as required, and placed upon the part after being wrung so it will not drip. It should be changed as often as every five minutes. This is often neglected, to the injury of the patient. A very cold compress may be prepared by placing snow or pounded ice between the folds of the compress. This will not need renewal so frequently; but its effects must be carefully watched, as injury may be done by neglect. In applying cold to such delicate parts as the eye, a very thin

compress is better. It should be renewed once in five minutes, at least.

When moist warmth is required, a thick compress should be used, being wrung dry out of cold water, and covered with a dry cloth to exclude the air. Soft, dry flannel is an excellent covering. Rubber or oiled silk may be employed when the compress is not to be retained more than a few hours. The effects of a compress thus employed are identical with those of the poultice, and the application is a much more cleanly one.

Compresses are applicable to all cases in which poultices are commonly used. They may replace the old-fashioned plasters with profit and comfort to the patient.

Fomentations.— This is a mode of applying moist heat by means of a flannel or sponge wet in hot water. The fomentation is a local application analogous to such general appliances as the hot pack, vapor bath, and hot-air bath. It consists in the application of a cloth wet in hot water. It may be considered as a hot compress. Fold a soft flannel cloth so that it will be of three or four thicknesses. Lay it in a basin, pour boiling water upon it, and wring it dry by folding it in a dry towel. Or, if only one end of the cloth is wet, it may be wrung by folding the dry portion outside of the wet; in wringing, the whole will become equally wet. Apply it to the patient as hot as can be borne. The second application can usually be made much hotter than the first. Frequently dipping the hands in cold water will enable the attendant to wring the cloths much hotter than he would be able to do otherwise.

A better way is to fold the flannel as it is to be employed, and then dip in very hot water, lifting it out by the corner, and placing it in the middle of a towel. Roll up quickly, lengthwise of the towel, and wring nearly as dry as possible by twisting the ends of the towel. In this way the fomentation can be wrung out much hotter than with the hands. Of course it will be too hot to apply to the bare flesh; but do not waste heat by letting it cool. Protect the skin by one or more thicknesses of flannel, and apply at once, covering with another dry flannel. The fomentation will gradually warm through, and will retain its heat two or three times as long as when applied in the ordinary way.

The hot cloths should be renewed once in two to five minutes. Two cloths should be employed, so that the second may be applied as soon as the first is removed. To retain the heat, a dry flannel, rubber, or oilcloth should be placed over the fomentation. The application may be continued for ten minutes to half an hour, or longer in special cases.

Alternate hot and cold applications are frequently more efficient than the continuous fomentation. Hot applications should generally be followed by the cool or tepid compress for four or five minutes, or the part should be briskly rubbed by the hand dipped in cold water, until the redness produced by the fomentation in part disappears. In neuralgia, gout, and chronic rheumatism, in which the cooling has a tendency to cause the return of the pain, the parts should be covered with dry, warm flannels, and so protected from the air. By this means, the good effects of the application may be prolonged.

When applied to the head for some time without intermission, it will often occasion faintness; hence a cooler application should be made after the use of hot cloths for five or ten minutes.

If the applications must be continued for a long time, it is well, in most cases, to employ them at a temperature slightly lower than when they are to be used for only a few minutes.

The uses of the fomentation are very numerous. It is indicated whenever there is local pain without excessive heat or evidences of acute inflammation. Local congestions, neuralgia, toothache, pleurisy, and most local pains, vanish beneath its potent influence as if by magic. For indigestion, colic, torpid liver, dyspepsia, constipation, and rheumatic pains, it is a remedy of great power, and is used with almost uniform success. In relieving sick headache, by application to the head, back of the neck, and the stomach, its efficiency is unrivaled. The fomentation is also useful in cases of great loss of blood, in which fatal fainting may be prevented by making a hot application to the head, and so encouraging the circulation of blood in the brain.

From Boyhood Up

THE little boy who stands prattling at his mother's knee, happy in the sunshine of her smiles, and sad only when her loving face shows grief or pain, is innocence personified. Fortunate indeed would it be for the human race if these days of childish innocence and purity might be lengthened out through all the years of boyhood to manhood. But rarely indeed is this the case. Almost at the threshold of life, vice or sin in some form steps in to mar its beauty and destroy its purity. How often has the sorrowing mother, whom death has called to lay away in the cold grave a lovely infant son, found consolation in the thought that death had claimed him while yet his heart was pure and his soul unstained; and, as she thought of that other son whom she had reared to manhood with tender care and prayerful solicitude, only to see her hopes dashed to the ground and her fond anticipations hopelessly wrecked by some emissary of evil who had led her beautiful boy, the child of her heart, down the steep declivity of sin to a living death of shame and ignominy,—how she has mourned that he, too, had not filled an infant's grave; and found comfort for the dead in sorrow for the living!

Nothing is more sad than to see a boy who, from earliest infancy, has been the object of parental care

and love, breaking away from the gentle restraints of home, and plunging headlong into sin and vice. To save some few boys, and to help them to grow up to a noble and useful manhood, is the chief object of this book.

Notice that little boy. His rosy face beams with a glorious wealth of untainted blood, and a constitution unimpaired by inherited disease. In his gleeful laugh rings the music of a brave and joyous heart. His bright, beaming eyes tell of a generous love and a trusting confidence. What wonderful promise of a grand and useful manhood is there! Could such a lad come up through youth and early manhood to mature middle age with all his faculties developed, expanded, strengthened with his growth, and matured by experience, what could he not accomplish?

Rarely indeed does a boy come to years of maturity without having lost, through ignorance or vice or bad conditions of life, much of those noble powers and qualities with which nature endowed him, and by means of which he might have served his fellow-men, and made life tenfold more useful than, with wasted powers and weakened energies, it is possible for him to do.

Boys' Rights.—Every boy has a right, first of all, to be well born. Of the few things which may be inherited from parents or ancestors, a good constitution and vigorous health and a well-balanced body may be reckoned as most valuable of all. It is as impossible to make a strong, energetic, healthy man out of a puny, weakly boy baby, as to make a strong ox out of a puny, sickly calf. It is true that in very

rare cases unpromising infants do afterward develop into strong and healthy persons; but in these instances the constitution must have been unusually vigorous to have enabled the person to surmount the obstacles presented by a feeble infancy and childhood, and develop the robust health of later years.

Badly Born.—Thousands of boys are cheated out of the life and vigor and physical stamina to which they are lawfully entitled, by the spendthrift habits, as regards vitality, of their parents. The wealthy man who squanders his property regardless of the future welfare of his children, spending his money recklessly and foolishly, is no more blameworthy than the man who squanders his capital of strength in the same manner. Many a lad might truthfully rise up in condemnation of his parents, and say, "My father ruined my constitution by bad eating or drinking, by excessive labor in the mad race for fame or riches, and by selfish gratification in the use of alcoholic liquors or tobacco." Or he might say, "My mother robbed me of the health to which I was entitled, by dressing regardless of the requirements of health, by fashionable dissipation of every sort, and by neglect of the bodily culture necessary to develop and maintain good physical health."

As an acute thinker has said, "The greatest of all human felicities is to be well born,"— a blessing which the greater proportion of human beings are not permitted to enjoy.

Being well born, a boy has a right to be well reared, to be carefully nurtured, like the rare and tender plant which the gardener carefully protects from injury from

every possible source, and faithfully supplies with all the conditions needed to develop in the very best possible manner and to the highest degree of perfection its symmetry and beauty. If one-half the amount of attention were given to children that is bestowed upon raising blooded horses, cows, sheep, or even sporting dogs and pet canaries, there would be a far less number of human beings who might be truthfully labeled, "human failures," numerous examples of which at present may be found in every community.

Parents who take the responsibility of bringing children into the world, should consider that in so doing they assume the grave responsibility of bringing them up in such a way as will make them capable of enjoying life, and making it a success for themselves and for their fellow-men. The rearing of a child comprises much more than simply supplying it with food and clothing and a place in which to live.

Other Natural Rights. — The natural rights of a child demand that it should be supplied with proper food, clothing, and a good home. Proper food and clothing mean, not simply such as happen to be most convenient, or even such as is fashionable or customary, but such as will best serve the wants of its body. Consequently, all parents should give to this matter serious study, that they may be able to form a proper judgment of what is best for their children in these particulars.

Thousands of young constitutions are every year ruined by bad food, before their possessors have reached the end of the first year of life; and thousands upon thousands perish before the fifth year is reached,

from the effects of bad feeding and bad clothing combined.

In thousands of homes, in civilized lands, the little ones lying in cribs or creeping or toddling about the floor, are being slowly poisoned by an atmosphere contaminated with impurities, the result of imperfect ventilation. Millions of human lives are snuffed out before the vital flame has scarcely begun to burn, by these unnecessary and most easily preventable causes. This is a matter certainly worthy of most serious attention on the part of every intelligent parent.

Education. — Every boy is entitled to a good education. By education we mean, not simply "schooling," or a course at a university, but that sort of training and culture which will fit him for usefulness in life. Education, if properly begun, will commence with the first dawn of intelligence. The human infant at birth knows less than the young of most lower animals at the same period of life, and some weeks elapse before any marked intelligence makes its appearance; but when the child first begins to reason, even in the most primitive and simple manner, its education really begins, and from this time forward its mental as well as its bodily activities should be directed in such a manner as to secure to it a symmetrical development of the entire individual, physically, mentally, and morally.

The so-called system of education and the influence to which most boys are subjected for a longer or shorter period while in school, seem to the writer to be exceedingly faulty. The aim appears to be to give the student facts and knowledge, rather than the ability to discover new facts and apply old ones. It usually neglects the

body almost wholly, and frequently produces a most one-sided development, which, while it at first enables the person to appear to great advantage, ultimately results in failure, both mentally and physically.

The aim of education should be to prepare the individual to make the most of himself in life. It should be a process which will make the most practical men, the most effective workers for the advancement of all human institutions. Any system which neglects any one of the three departments of human nature, mental, moral, or physical, must be necessarily a failure. Simply educating a boy in the arts and sciences, without developing a love for truth, purity, goodness, justice, and other moral qualities, only prepares him to become the most expert of criminals, and fits him the most successfully to elude discovery and defeat justice. So, also, mental and moral discipline, without proper physical culture, may in many respects qualify men for great usefulness in those departments of human life; but will very likely leave them so lacking in the physical force and stamina required for an active and useful life as to render them dead weights upon society, rather than effective agents for the advancement of its interests.

Proper Aims of Education.—The education should be such as will encourage originality of thought, thoroughness in investigation and research, and thoroughness in everything. Impracticable and dogmatic methods, so generally employed in the education of the young, generally result in dwarfing the most valuable qualities of the mind; and it is only those minds which are possessed of an extraordinary degree of individu-

ality and independence of thought that are able to escape this depraving and deteriorating process.

When a boy first begins to observe and think, encourage his budding mind in the direction in which the natural instincts lead. Bring in his way objects of interest which will attract his attention. When he gets old enough to question concerning the properties of the new objects which he sees, patiently satisfy his curiosity by giving him the information which he desires. If he shows some originality of thought, encourage him in thinking for himself, and lead his mind in such directions as will give his investigative disposition opportunity for a healthy development.

Even oddities and eccentricities are by no means to be always repressed, though excessive oddity should not be encouraged. If there were no odd or eccentric people in the world, there would be little or no progress. The strange departures from the beaten track of custom in thought and manners which sometimes amuse or startle us, often lead to the discovery of new truths or the exposure of old errors, which are fostered and maintained more effectively by our conservative educational systems than would be possible by any other means.

Habits.—Cultivation of correct habits from earliest childhood up, especially during the years preceding the attainment of maturity, is a matter of greatest consequence to every human being. Habits are very easily formed, but are changed only with the greatest difficulty. Habits are created simply by the repetition of the same act. In the beginning, the formation of good habits is often not more difficult than the formation of

bad habits. The repetition of good acts renders them so easy that they are performed almost automatically, without a thought and without effort. By repetition, also, bad habits come to be performed with equal ease. No parent can accomplish so much real good for his son in any other way as by aiding him in the early years of life in the formation of thoroughly good habits.

The easy grace and courtesy of manner which enable some men to make friends of every one they meet, and without apparent effort, are almost entirely the result of the early formation of habits of manner which render them agreeable to their fellows. The boorishness and repulsiveness of other men, whose real mental and moral worth may be quite as great, which interfere so greatly with their success and advancement in life, may also be traced, in most instances, to the formation in boyhood of bad habits in relation to personal manners and deportment.

So it is in other particulars. Bad habits that are acquired in boyhood, usually adhere to an individual through his whole lifetime. In early boyhood, while the brain is soft and impressible and easily molded by the influences which may be brought upon it, it is a matter of greatest importance that correct and thorough habits should be formed. Habits relate to physical and mental as well as moral acts, and have an important relation to nearly every act or thought.

It is plainly the duty of parents to aid their children in forming such habits as will be conducive to their happiness and usefulness in after years. A child allowed to grow up with slack, slovenly, and careless

habits, will all his lifetime be compelled to contend against obstacles to success which will make failure in every undertaking of life almost certain; while a child whose early education has been such as to enable him to acquire habits of order, promptness, neatness, thoroughness, and faithfulness, possesses such qualities as will insure success in almost every enterprise he engages in. Every child ought to appreciate the aid which may be given by its parents in the formation of correct habits, and should readily listen to the advice and counsel which the wisdom and experience of a father or a mother may so well give, and which will be of inestimable value to a young and inexperienced lad.

Food, Health, and Morals. — Of physical habits, some of the most important relate to eating. As these habits are formed at a very early age, and have most important relations to health and happiness in later years, they are particularly worthy of attention. A child, even at a tender age, often acquires the habit of eating for the simple purpose of gratifying the palate, and very early acquires those tendencies which, when fully developed, end in a complete enslavery of the individual to appetite, or gluttony. At a very early age, the child should be taught that the appetite is to be controlled, that its palate must not be the sole judge respecting its food, but that reason must wield the controlling influence; that it should eat what is best for it, rather than what it likes best. Of course, it is understood that the food should be palatable, and calculated to satisfy a healthy taste; but children very soon acquire a fondness for highly flavored substances, such

as sweetmeats, tidbits of every sort, and stimulating foods; and if the appetite is gratified, it soon demands continual satisfaction, to the exclusion of those simple and less highly flavored substances which constitute the natural food of children, and which satisfy a healthy and unperverted taste. The aim should be to preserve natural simplicity of taste, unexaggerated by morbid excitation of the bodily appetites.

Quite extended opportunities for observation have convinced us that the common custom of supplying children with liberal quantities of meat, is a practice which tends to the excitement of morbid and unwholesome tendencies, and is very often productive of disease. Nature furnishes, in the easily digestible grains, fruits, and milk, foods which are perfectly adapted to the digestive organs of a child; and if the dietary is restricted to the use of these articles, most of the derangements of the digestive organs to which children are so often subject, could be avoided. The use of spices, pepper, mustard, vinegar, cloves, etc., is wholly uncalled for by a healthy taste, and may operate in the strongest possible manner to create an artificial craving which demands an excess of food, and produces, at an early age, conditions which ultimately result in dyspepsia and various physical disorders of a serious character.

The habit of eating between meals, so common among little boys, cannot be too strongly condemned. Such irregularities are not the result of a healthy appetite, but of a morbid craving, which frequently arises from a disordered stomach, and which requires attention, but not feeding.

American boys undoubtedly suffer far more than those of any other land from the disregard of these facts. The peasant boy of Italy, Germany, France, or even England, is satisfied with the very simplest, and often the most meager fare. The Scotch boy eats his bowl of brose, or oatmeal gruel, with a far keener relish than the American boy finds in the highly seasoned viands, the rich cakes, savory pies, and tempting tidbits which his mother, in her mistaken fondness, prepares for him. The Italian boy finds vastly more satisfaction from his meal of boiled or roasted chestnuts than the American boy obtains from the rich and savory dishes so common on American tables.

How often do we hear little boys say, when food is offered them, "I don't like this," or, "I can't eat that." Such remarks are a pretty sure indication that bad habits in eating are already formed, and that such a child may be benefited by going without food until he obtains a relish for wholesome and simple fare.

A Parental Duty.— Parents should take pains to get acquainted with their boys. Often have we known of instances in which boys have grown from infancy to manhood without having really become acquainted with their parents, and their parents were equally unacquainted with them. Parents ought to encourage a disposition in their boys to confide in them in early infancy, so that they may become acquainted with their childish griefs and trials, and know their hopes and aspirations, and be prepared to direct their minds in safe and wholesome channels. Such an acquaintance will enable parents to supply those higher wants of their children which are quite as essential to their

well-being as proper food, clothing, and shelter. It will aid them in providing suitable food for their higher natures.

Make Home Attractive.— Parents ought to consider it a part of their duty to satisfy the love of the beautiful in their children, as well as to satisfy their hunger. To this end their aim, so far as consistent with their means, should be to render beautiful, by tasteful, even though they may be simple and inexpensive, decorations of the dwelling and its surroundings. Useful and entertaining books should be supplied as the child advances in years. The home should be made so attractive and home influences so strong that no influence beyond the domestic circle will be sufficiently powerful to neutralize or destroy it. Thousands of boys are led into the broad way of vice and sin who might have been saved to virtue and usefulness, if the home had been attractive, instead of being dull and uninteresting, or absolutely repulsive, as is too often the case.

Special Dangers to Boys.—Thousands of pitfalls lie along the road which leads from boyhood up to manhood. Fortunate indeed is the lad who keeps so close along the strait and narrow path of right doing as to avoid them all. One of the first of the evil habits into which boys are apt to fall is that of disrespect to parents. It is so easy to disobey the commands of father and mother, when they are not at hand to enforce them, or when the disobedience may not be discovered by them; and by and by, especially if the kind-hearted parent fails to administer a proper rebuke or punishment, the child comes to disregard altogether his obligation to obedience. Such a lad is already advanced

far on the road to ruin, and nothing is wanting but opportunity and favorable circumstances to lead him to the commission of almost any sin. Parents cannot do their children any greater wrong than by neglect to exact of them prompt and explicit obedience to their commands.

A wise parent will of course avoid demanding of a child that which is unreasonable, or which may with reason appear to the child to be an act of tyranny or a disregard of its rights. Such a course will destroy the respect of a child, and counteract the effect of any amount of exhortation or even punishment. Most unhappy is the home in which an unruly child holds the reins. We have seen some such homes, in which fathers, mothers, elder brothers and sisters were all in thorough subjection to the petty whims of an infant tyrant, who had been foolishly indulged and petted in his perverseness until he had come to be an autocrat of the domestic circle.

High-Headedness.— Some years ago, the writer was present at a large religious gathering at which a great sensation was produced by a speaker who arose, and, in most impressive tones, exclaimed, "It is a terrible thing for a man to have his own way." As the words were repeated several times, each time with renewed emphasis, the immense audience fairly trembled at the dire consequences which may result to the man who gives himself up to doing as he pleases. Terrible indeed is it for a man to have his own way, but tenfold more terrible for a child to have his own way, to follow his inclinations without restraint, to know no law but the demands of his own depraved nature and undisciplined will.

The parent who allows his boy to grow up wilful, headstrong, undisciplined, and neglectful of the rights and wishes of others and his obligations to law, human and divine, should not charge his misfortunes to Providence if such a son brings down his gray hairs with sorrow to the grave.

Reliability and Genuineness.—Another of the pits of evil into which boys are apt to fall, is that of deception. A little boy, in the absence of the parental eye, has been guilty of an act of disobedience. His mother says, "My son, have you disobeyed my commands?" Shame and fear of punishment tempt him to say "No;" and the mother's fondness may lead her to neglect to inquire into the matter with sufficient care to discover the untruth. One falsehood prepares the way for another, until by and by the love of truth, honesty, and sincerity is totally destroyed, and the lad grows up sadly lacking in those qualities which fit men for positions of trust and responsibility. Such a boy may sometime appear as a defalcating bank cashier or president, or a swindling "confidence man." Genuineness is a trait of character whose value is priceless; and one of the saddest features of our modern times is the growing scarcity of real genuineness, thorough honesty, or steadfast sincerity and reliability. The boy who hopes to be a noble man, worthy of the respect of his fellow-men, and capable of wielding a wide and lasting influence in the world, must from his earliest boyhood cultivate fidelity, honesty, sincerity, truthfulness, and genuineness.

Profanity.— Close upon the heels of the evils already mentioned, which ruin the character and useful-

ness of so many boys, comes that most absurd and unaccountable of vices—profanity. Nothing is more shocking than to hear, when walking along the street, most terrible oaths, lisped by lips that are too young to speak distinctly, but already familiar with the vile language of the street. What can we hope of such a boy, but that he will develop in due time into a criminal of the deepest dye, and be graduated from the school of vice into some prison or reformatory at an early age?

Vicious Habits.— One who has an opportunity to see many of the boys of the present generation, often says to himself, "Whence will come the men to fill the positions of trust and influence twenty years hence?" Vicious tendencies seem to have taken possession of by far the greater share of all the boys we meet. The cigar, the cigarette, and the filthy quid claim them as their votaries at an early age. Often have we seen, in large cities, ragged little urchins, scarcely old enough to walk, picking out of the filth the short stumps of cigars cast away by old devotees of the weed, and enjoying them with apparently as keen a relish as the most experienced smoker. The tobacco-using boy soon learns to drink beer and ale, from which it is an easy step to strong liquors and drunkenness.

Worse Vices. — These bad habits and vices are usually accompanied, if not preceded, by others even more debasing in their effects upon the mind, and more destructive to the body. Practices too vile to be even mentioned in these pages are common enough among boys addicted to the vices named, and often among those whom we least suspect of vicious tendencies of

any sort. The company of bad boys—boys who indulge in obscene and filthy talk—should be shunned as carefully as though they were afflicted with some loathsome and contagious disease. No physical disease is more contagious than habits of mental and physical uncleanliness. Fearful indeed is the extent of such habits among the boys of the present generation, including all classes, even the little toddlers of the nursery, to whom the most horrible practices are taught by vile associates and wicked nurses. Impurity in thought or act is one of the most universal of vices among boys. At the present time, scarcely a schoolboy can be found so young that he has not already been instructed in sensuality.

One of the most evident duties of parents to their boys is to instruct them regarding the wickedness and the dangers of vice, and to carefully guard them from the contamination of evil associates.

A boy whose instincts are pure, will flee from the first suggestion of obscenity or vileness, and will avoid those known to be abandoned to sin as carefully as he would avoid a loathsome disease or a poisonous reptile. Happy indeed is the lad who grows to manhood unscathed by the scorching flames of sensual vice, and with a mind unstained by filthy imaginings and mental impurity.

How to be Well

IN this short chapter, the reader will find a few important hints respecting the general care of the health, a subject which has not received special attention in other chapters in this work, but which is well worthy of the careful consideration of one who wishes to attain a high degree of physical vigor, and the full enjoyment of all his faculties and senses. The cultivation of health by attention to all the laws which govern the various activities of the body, is one of the most profitable occupations to which a portion of one's time can be devoted.

CARE OF THE SKIN.

The following remarks on this subject are quoted from a larger work by the author, entitled the "Home Hand-Book of Domestic Hygiene and Rational Medicine:"

The skin is one of the most important depurating organs of the whole body. From each of its millions of pores constantly flows a stream laden with the poisonous products of disintegration. As the water evaporates, it leaves behind it these non-volatile poisons, which are deposited as a thin film over the whole surface of the skin. As each day passes, the process continues, and the film thickens. If the skin is moderately

active, three or four days will suffice to form a layer which may be compared to a thin coating of varnish or sizing. The accumulation continues to increase, unless removed, and soon undergoes further processes of decomposition. It putrefies,—rots, in fact,—and develops an odor characteristic and quite too familiar, though anything but pleasant, being at once foul, putrid, fetid, pungent, uncleanly, and unpardonable.

But the offense to the nose is not the extent of the evil. The unclean accumulation chokes the mouths of millions of little sewers which should be engaged in eliminating these poisons, and thus obstructs their work. Being retained in contact with the skin, some poisons are absorbed, together with the results of advancing decay, thus re-poisoning the system, and necessitating their elimination a second time.

Here, water serves a most useful end, if properly employed. It is unexcelled as a detergent, and by frequent application to the skin, will keep it wholly free from the foul matters described. The necessity for frequent ablutions is well shown by the fact that nearly two pounds of poison-laden solution—the perspiration—are daily spread over the body. It is not an uncommon occurrence to meet with people who have never taken a general bath in their lives. Imagine, if possible, the condition of a man's skin, at the age of seventy or eighty years, which has never once felt the cleansing effects of a thorough bath!

How to Make the Skin Healthy.—A man who has a perfect healthy skin, is almost certain to be healthy in other respects. In no way can the health of the skin be preserved, but by frequent bathing. A daily or tri-

weekly bath, accompanied by friction, will keep the skin clean, supple, and vigorous. There is no reason why the whole surface of the body should not be washed, as well as the face and hands. The addition of a little soap is necessary to remove the oily secretion from the skin.

A lady of fashion, in enumerating the means for preserving beauty, says: "Cleanliness, my last recipe (and which is applicable to all ages), is of most powerful efficacy. It maintains the limbs in their pliancy, the skin in its softness, the complexion in its luster, the eyes in their brightness, the teeth in their purity, and the constitution in its fairest vigor. To promote cleanliness, I can recommend nothing preferable to bathing. The frequent use of tepid baths is not more grateful to the sense than it is salutary to the health and to beauty. . . . By such means, the women of the East render their skin softer than that of the tenderest babe in this climate." "I strongly recommend every lady to make a bath as indispensable an article in her house as a looking-glass."

When foul matters which ought to be eliminated by the skin and quickly removed from the body, are allowed to remain undisturbed, the skin becomes clogged and inactive, and soon loses its natural luster and color, becoming dead, dark, and unattractive. When bathing is so much neglected, it is no marvel that paints, powders, lotions, and cosmetics of all sorts are in such great demand. A daily bath, at the proper temperature, is the most agreeable and efficient of all cosmetics.

Bathing Protects against Colds. — It is an erroneous notion that bathing renders a person more liable

"to take cold, by opening the pores." Colds are produced by disturbance of the circulation, not by opening or closing the pores of the skin. Frequent bathing increases the activity of the circulation in the skin, so that a person is far less subject to chilliness and to taking cold. An individual who takes a daily cool bath has almost perfect immunity from colds, and is little susceptible to changes of the temperature. Colds are sometimes taken after bathing, but this results from some neglect of the proper precautions necessary to prevent such an occurrence.

Aristocratic Vermin.—Doubtless, not a few of those very refined and fastidious people who spend many hours in the application of all sorts of lotions and other compounds to the face and hands, for the purpose of beautifying those parts of the person exposed to view, while neglecting as persistently the parts of the person not exposed to observation, would be very much surprised to learn the true condition of the unwashed portions of their cutaneous covering. They instinctively shrink with disgust from a vermin-covered beggar, in whose cuticle burrows the *acarus scabiei* (itch-mite), while troops of larger insects are racing through his locks and nibbling at his scalp. It is quite possible that many a fair "unwashed" would faint with fright if apprised of the fact that her own precious covering is the home of whole herds of horrid-looking parasites which so nearly resemble the itch-mite as to be at least a very near relative, perhaps half-brother or cousin. The name of this inhabitant of skins unwashed is as formidable as the aspect of the creature, though it does not require a microscope to display its pro-

portions, as does the latter; scientists call it *demodex folliculorum.*

The demodex makes himself at home in the sebaceous follicles, where he dwells with his family. Here the female lays her eggs, and rears her numerous family, undisturbed by the friction of any flesh-brush, and only suffering a transient deluge at long intervals, if such a casualty ever happens. In studying the structure of these little parasites, we have sometimes found several tenants occupying a single follicle, pursuing their domestic operations quite unmolested by any external disturbance.

The demodex has been transplanted from the human subject to the dog, and it is found that the new colony thrives very remarkably, and soon produces a disease apparently identical with that known as "mange."

We have not space to describe in detail these savage little brutes, with their eight legs, armed with sharp claws, bristling heads, sharp lancets for puncturing and burrowing into the skin, and their powerful suckers for drawing the blood of their victims. We care only to impress upon the mind of the reader the fact that neglect of bathing and friction of the skin is sure to encourage the presence of millions of these parasites, and that the only remedy is scrupulous cleanliness of the whole person. Like their relative, the itch-mite, they do not thrive under hydropathic treatment, and are very averse to soap and water. The best way to get rid of them is to drown them out. They do not produce the irritation which characterizes the presence of the itch insect, so that this evidence of their presence is wanting. But they are likely to be present in a

torpid, unhealthy, unwashed skin, no matter how delicate or fastidious its possessor.

Bathing a Natural Instinct. — All nature attests the importance of the bath. The rain is a natural shower bath in which all living things participate, and gain refreshment. Its invigorating influence is seen in the brighter appearance, more erect bearing, and brighter colors of the plants after a gentle rain. The flowers manifest their gratitude by exhaling in greater abundance their fragrant odors. Dumb animals do not neglect their morning bath. Who has not seen the robin skimming along the surface of the lake or stream, dipping its wings in the cool waters, and laving its plumage in the crystal drops that its flapping pinions send glittering into the air? No schoolboy who has ever seen an elephant drink will forget how the huge beast improved the opportunity to treat himself to a shower bath, and perhaps the spectators as well, for he is very generous in his use of water.

If man's instincts were not rendered obtuse by the perverted habits of civilization, he would value the bath as highly, and employ it as freely, as some of his more humble fellow-creatures, whose instinctive impulses have remained more true to nature, because they have not possessed that degree of intelligence which would make it possible for them to become so grossly perverted as have the members of the human race. Man goes astray from the path of rectitude, not because he is deficient in instinct, but because he stifles the promptings of the divine voices, which would lead him right if he were obedient to them.

The Best Material for Underclothing. — As the skin is constantly throwing off moisture, it is very im-

portant that the clothing shall be able to take it up and transmit it to the air. Woolen goods hold the moisture for a long time, and accumulate it, and with it of course are retained the various excretory substances which escape from the body in the sweat. It is on this account not well adapted for garments to be worn next to the skin. Linen is superior to all other fabrics for this purpose. Cotton stands next in value. The fact that the quick drying of linen exposes the skin to rapid cooling by evaporation, necessitates the wearing of outer garments of wool to prevent the too rapid loss of heat during those seasons of the year when extra precaution is required, which means practically every day in the year in nearly all parts of the world. The only exceptions are those extremely hot localities in the tropics in which the temperature ranges high both day and night.

Loosely woven garments are decidedly preferable to close fabrics, for the reason that they are more permeable to air, and hence allow a frequent change of the air in contact with the body. Warmth may be obtained by increased thickness. The air inclosed in the meshes of a fabric constitutes an excellent nonconductor. Several thin garments are on this account much warmer than one thick one, the interposed layers of air having a high protective value.

The wearing of linen next to the body is certainly conducive to cleanliness. Linen undergarments prevent undue heating of the skin and accumulation of moisture, which has the effect to relax the skin and maintain constantly in a moist and decomposing state the excretory substances thrown off. Linen undergar-

ments are also less irritating than those made of wool. This fact is recognized by many persons whose skins are especially sensitive. Linen may be worn at all seasons of the year. It is only necessary to provide sufficient outer clothing to secure the necessary warmth. An additional pair of thick undergarments affords better protection than extra outer wraps, and are less expensive.

White Garments Preferable to Colored.—The color of the clothing is of importance, because of its transmission and absorption of the sun's rays. Dark-colered fabrics, especially that of rough texture, absorb the heat rays, and this leads to an accumulation of heat. At the same time, however, they protect the body from the chemical rays of the sun. The head is, ordinarily the only part of the body which requires protection from the sun, and for this, ample protection is afforded by hats of various sorts, with the addition of a moist cloth laid inside upon the head, if necessary in very hot weather. The heads of work horses may with advantage be protected in like manner by means of a straw hat and a wet sponge.

On the whole, white garments offer advantages over those of any other color, for the reason that they transmit a considerable amount of light. Contact of light with the skin is necessary for its health. Exposure of the skin to the direct rays of the sun is also advantageous and promotive of skin cleanliness, as by this means many disease-producing germs which accumulate upon the skin may be destroyed, even though they may have escaped removal by the bath.

A matter of the highest importance is the equable

clothing of the body so that there shall not be undue accumulation of heat in certain parts, while other parts are insufficiently protected. The arms and legs, and particularly the feet, require special protection, for the reason that they are farthest from the body, while they present a larger surface in proportion to their weight and the amount of blood supplied to them than does the trunk. Many persons suffer greatly from insufficient clothing of the limbs in the cold seasons and on cold mornings and evenings, without being aware of the cause of their illness. Congestion of the head, and various disturbances of the stomach and bowels and other internal organs, and especially lung affections, are the result of this neglect. When the arms and the limbs are chilled, their blood vessels are contracted, and some internal part must of necessity be overcrowded with blood, or congested. A state of congestion is always one of weakness and lowered resistance to disease, and is the introduction to chronic maladies and even degenerations and organic changes.

Useful Hints Respecting the Clothing. — A few "don'ts" in relation to clothing may be found helpful:

Don't dress the neck too warm when going out in cold weather. A little extra protection is required for the ears, but it is not necessary to muffle up the neck with thick furs to protect the ears. A light scarf or ear muffs are all that is needed. Warm wrappings about the neck cause the skin of the neck to become moistened with perspiration. When the wrappings are removed indoors, the slow cooling which takes place in consequence of the evaporation, chills the parts, and may produce sore throat or nasal catarrh.

Don't wear rubbers indoors, nor out of doors, except when it is necessary to prevent wetting the feet. Rubbers being impervious to air, prevent evaporation, so that the perspiration is retained, and the shoes and stockings become damp from the perspiration. When the rubbers are removed, evaporation chills the feet, the same as though they had been wet by the rain or by walking on a wet pavement. On removing the rubbers after they have been worn for some time, it is a good precaution to remove the shoes and stockings and put on dry ones. If this cannot be conveniently done, care should be taken to keep the feet warm until the shoes are dry. The rubbers should be dried before wearing again.

Don't wear a mackintosh or rubber overcoat, except when necessary; and on removing the waterproof, when it has been worn for some hours, don't forget to change the undercoat also. The clothing is saturated with moisture from the skin, and a chill may be induced by evaporation from the moist clothing.

Don't wear at night underclothes which have been worn during the day.

Don't forget, on going to bed at night, to hang up the underclothing in some place where it will air overnight. It is a good plan to lay the clothing over a warm steam coil when it is convenient to do so. Persons who perspire freely should employ two suits of underclothing, wearing each every other day, allowing one day for airing and drying.

Don't wear more clothing than is really necessary for comfort. Many people render themselves sensitive to cold by wearing too much clothing.

On going out of doors, don't forget to slip on an outer garment of some kind if the temperature is considerably lower than the indoor temperature; especially protect the head and the feet.

Don't wear thin-soled shoes at any season of the year. One may take cold from chilling of the feet as the result of wearing thin-soled shoes in walking over a cold pavement, even when the pavement is perfectly dry.

Don't adjust the clothing to suit the season of the year only, but adapt it to the weather conditions of each particular day.

Don't wear high-heeled shoes, nor pointed shoes, nor narrow-soled shoes, nor tight shoes, nor low shoes. Don't wear slippers, except in the house. Shoes must have broad, reasonably thick soles, plenty of room for the toes, low heels. Rubber heels are a great comfort.

Don't support the clothing by bands tight about the waist.

Don't constrict the limbs by means of elastic bands to support the stockings. Support all clothing from the shoulders, not by bands, but a waist, or the "union" plan.

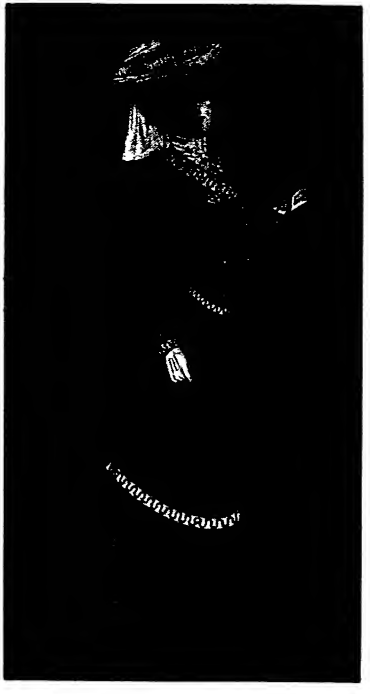
It is rare to find a woman who will admit that her clothing is too tight, and yet it is equally hard to find a woman whose clothing is not so tight as to do serious damage. Unfortunately, the idea prevails among women that a small, round waist is a mark of beauty and a thing much to be desired. Men probably to a considerable extent entertain this same erroneous notion. The fact is that women naturally have larger waists than men, compared with their height. This

is due to two facts: (1) That the stomach, liver, bowels, spleen, and other organs are larger in women than in men of the same size; (2) that women are naturally a little more fleshy than men, and have plumper figures. If a woman has a smaller waist than a man of the same height, it is because she has made it so by an unnatural mode of dress; just as the Chinese women make their feet ridiculously small by compression, so the American woman makes her waist absurdly narrow in the same way.

The author has measured the waists of a large number of civilized women of different nationalities, —American, English, French, and German, Indian women, Mexican women, Chinese women, Zulu women, Arabian women, Egyptian women, negro women from far up the Nile,—and has invariably found that women who have never been deformed by wearing the clothes which the civilized woman habitually wears, have waists larger in proportion to their height than have men of the same race. The author has taken the pains, also, to measure a large number of ancient models as represented in famous statuary. He finds the same thing to be true. Here are some figures. The circumference of the waist of the Venus de Milo is nearly one-half that of the height of the figure, the exact proportion being 47.6 per cent of the height. The following table shows the figures obtained by modern measurements:

	Per Cent of Height
French peasant women	45 4
Chinese women	45.4
Average of forty-three American women, eighteen to twenty-five years of age, wearing healthful dress	44.64
Venus de Milo	47.6
Average of two thousand men, eighteen to twenty-five years of age, measured by Dr. Seaver of Yale	42.7
Average of eleven hundred women wearing ordinary dress	39
Apollo Belvidere	45

THE VENUS DE MILO



A FASHON-DEFORMED WOMAN

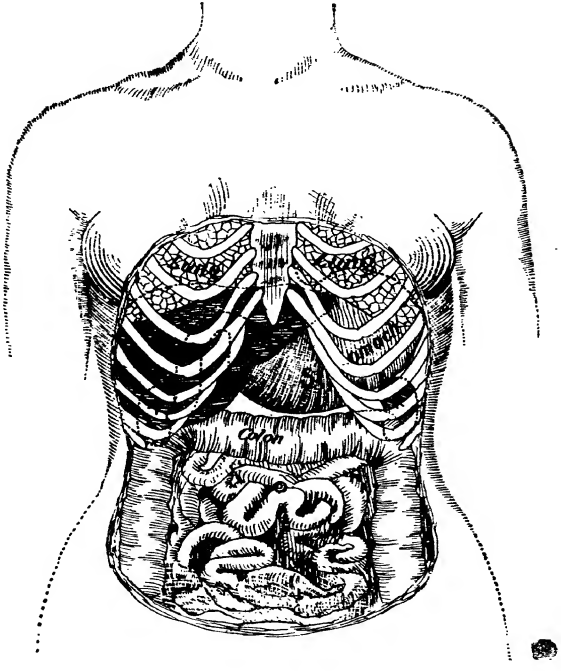
From these figures we see that the waist measurement of the Apollo Belvidere is more than two per cent less than that of the Venus de Milo. The waist measurement of two thousand men, measured by Dr. Seaver, is nearly 3 per cent less than that of the average French woman, 3.7 per cent more than that of the average American woman, 2 per cent less than that of the average American woman when wearing a healthful dress. The proportions of the Venus de Milo, recognized by artists as the finest model in existence, show a waist measurement five per cent greater than that of the average American man. That this proportion is not abnormal is shown at once by a glance at the reproduction of this beautiful Greek statue shown in the accompanying cut.

The fashionable dressmaker insists that the young lady's figure must be "*formed,*" and so as she develops she grows into a mold, like a cucumber in a bottle. And thus it happens that we find the civilized woman with a waist disproportionately small, as we find among the aristocratic class of Chinese women, dwarfed and misshapen feet. The small-footed woman of China, in consequence of her deformity, is compelled to hobble about in a most ungraceful fashion, requiring usually one or more persons to sustain her in keeping her balance. She cannot run, skip, or work, as can her large-footed sisters. She is willing, however, to endure the inconveniences of being a cripple and the loss of the use of her feet and legs rather than forego the pleasure of being in fashion. If the sacrifices which the civilized woman makes to fashion were no greater, there would be comparatively small ground

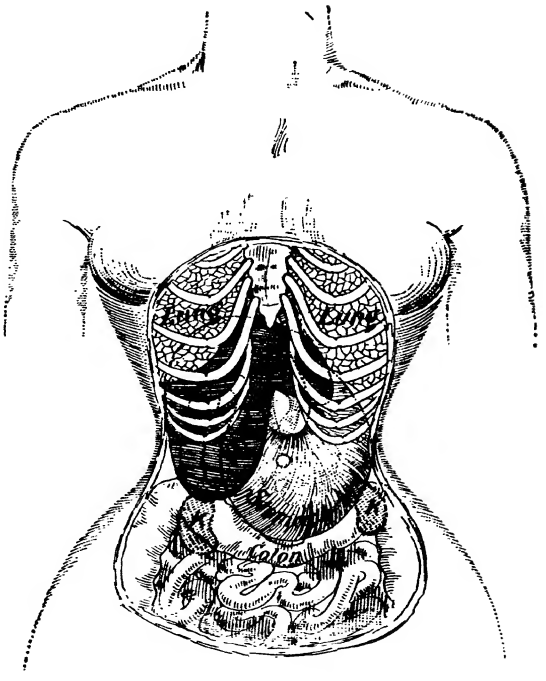
for complaint; but the habitual girding of the waist results in mischiefs of vastly greater magnitude than those which the Chinese woman inflicts upon herself.

The injury resulting from this waist constriction is not simply an external deformity. The chief evil consequences are those which result from the displacement of the stomach, liver, bowels, kidneys, and other abdominal organs. Numerous important facts in relation to the serious consequences resulting from displacement of this sort have been developed as the result of comparatively recent discoveries and researches. Professor Glenard, of France, for example, has brought out the fact that a great number of chronic diseases of the stomach, liver, and nerves are due to the simple displacement of the stomach and bowels.

In an accompanying illustration is shown the effects which actually resulted from the compression of the ordinary dress. This lady was certain that she had never worn her clothing tight. She had never intended to, her clothing was always comfortable; but both her kidneys were found floating, and they had fallen several inches below the ribs, her stomach had fallen nearly to the umbilicus, the colon was lying still lower down, and the patient was in an exceedingly wretched state as the result. It is not necessary that the waist should be greatly constricted that these effects should result. Pressure of the belts just tight enough to prevent expansion of the waist in breathing will ultimately result in pushing the important organs which lie above the waist downward to the extent of several inches. This result is produced by the expansion of the lungs in deep breathing. In coughing, lift-



THE INTERNAL ORGANS IN NORMAL POSITION.



THE INTERNAL ORGANS DISPLACED BY WAIST CONSTRICTION.

ing, singing, or as a result of deep breathing induced by exercise, the diaphragm forces the stomach and other organs downward. When there is opportunity for the waist to expand, the additional room required for expansion of the lungs is obtained by separation of the ribs, allowing a lateral expansion of the abdominal space; but when this expansion of the lower part of the chest is prevented by belts, bands, tight waists, or a corset, the stomach and other organs must be crowded downward below their normal position; and a frequent repetition of this action finally results in prolapse of all the organs which occupy the upper part of the abdominal cavity. It is no more possible for a dislocated stomach to perform its functions properly than for a dislocated hip to serve its proper purpose. In fact, dislocation of the hip or knee is a much less serious injury, and likely to affect the general health far less injuriously than dislocation of the stomach or liver or kidneys. Extreme waist constriction not infrequently causes still more dreadful deformities of the liver, which interfere with its function. It is possible, even, that the liver may be cut in two. The author has met two cases of this sort. A German surgeon was obliged to open the abdomen of a woman, and remove a portion of the liver, which had been cut off by constriction of the waist, and had become gangrenous.

The author, a number of years ago, made a careful examination respecting the position of the stomach, liver, and bowels in fifty working men and seventy-one working women, all of whom were in ordinary health. In the seventy-one women examined, pro-

lapsus of the stomach was found in fifty-six cases. In nineteen of these cases, the right kidney was found prolapsed, and in one case, both kidneys. The fifteen cases in which the stomach and bowels were not prolapsed were all persons under twenty-four years of age. None of these would admit that they had ever laced tightly, and four had never worn corsets or tight waistbands, having always worn the clothing suspended from the shoulders. It is noticeable that in a number of cases in which corsets had never been worn, tight waistbands had produced very extensive displacement of the stomach, bowels, and kidneys. In one of these the liver was displaced downward.

In fifty men, the author found only six in whom the stomach and bowels could be said to be prolapsed. In one, the right kidney was prolapsed. In only three was the degree of prolapse anything at all comparable with that observed in the women, and in these three it was found, on inquiry, that a belt or something equivalent had been worn as a means of sustaining the pantaloons. In another case the patient very properly attributed his condition to the wearing of a truss furnished with a belt drawn tightly about the waist.

From the above facts it appears that prolapse of the abdominal organs was found present in eighty per cent, or four-fifths (four out of five) of the working women, all of whom considered themselves in ordinary health. Prolapse is produced in men, as in women, by wearing belts instead of suspenders to support the clothing. A military officer who was under the author's care several years ago had a floating kidney which was the result of the constriction of the sword belt.

He had been in the habit of carrying a heavy sword for many years. In the case of a blacksmith in whom a floating kidney was found, it was due to the practice the man had of tying his leathern apron strings tightly about his body while shoeing horses. In both these cases the patients were suffering much pain and distress because of the condition of the kidney, but were wholly oblivious to the mischief which had been done by the practice of girding the waist. Such cases are not rare among men, although by no means so common as among women.

The proper action of the chest may be aptly compared to that of a pair of bellows. The lower ribs, to which the strong breathing muscles are attached, serve as handles.

In natural breathing, the action is chiefly at the waist, although the entire trunk wall and every organ within the trunk participates in the movement. The action begins with expansion, first the sides, and then in front, finally a slight elevation of the upper chest, and, in forced respiration, a slight drawing in of the lower abdomen at the same time with the chest elevation.

The average civilized woman is certainly very much inferior to the average civilized man in physical vigor. The constancy of this observation has led both the profession and the laity to regard woman as naturally weaker than man. But that this is not necessarily so, is shown by the constant experience and observations of travelers among uncivilized tribes. Travelers in China are often astonished at the immense loads which Chinese women carry upon their shoulders. Some

years ago the author saw a woman in the market place at Naples, Italy, carrying off upon her head an immense load of vegetables, which required two men to lift into position. De Saussure relates that when he had finished his observations in the valley of Zermatt, he packed a collection of mineralogical specimens in a box, and called for a porter to carry it out of the valley, as the mountain roads were too steep to be traveled by four-footed animals of any sort. After a fruitless search for a man who was able to transport his box of specimens, he finally was told that if he wished a porter to carry his package, he must employ a woman, as no man could be found who was able to even lift the box. He accordingly engaged a woman who offered herself for the purpose, and stated that she carried the heavy box of minerals over the steep mountain roads without the slightest injury either to it or to herself.

Most invalid women complain of pain when on the feet, dragging pain in the bowels and the lower portion of the back, pain at the extreme lower end of the spine, soreness and pain in the region of the navel, a feeling of lack of support in the lower abdomen, a sensation commonly described as "goneness" at the pit of the stomach, weakness of the lower limbs, pain in the back, crawling, tingling, numbness, stinging, and other sensations in the legs, cold hands and feet, burning of the soles and palms. Sometimes the patient says that when on her feet she is only comfortable when holding up the bowels with the hands. Such patients tenaciously cling to the corset because they evidently need some support. These patients also

often complain that when they undertake to stand without a corset, there is such a sinking at the stomach that they are compelled to sit down. The evident cause is the dragging of the prolapsed bowels and stomach occasioned by the relaxation of the abdominal muscles, by which the branches of the pneumogastric and sympathetic nerves are put under an unnatural strain.

Neither a proper knowledge of the requirements of the body nor a just consideration of the principles of beauty justifies the popular mode of dress. The idea that a small waist or a round waist is beautiful, is a mischievous and dangerous notion which ought to be eradicated from the public mind. God never made a waist round, slight, or tapering, as though it were chiseled out of a block of wood; and why should we allow ourselves to be persuaded by the fashion mongers to regard as beautiful a thing which from an artistic standpoint is truly hideous, monstrous, and repulsive? An artist who should make an undraped figure with the waist modeled after a French corset, would not be allowed to exhibit his work in any respectable gallery.

We see in the enormous busts and bustles which fashion prescribes, an evident attempt to cover up by means of these excrescences the uncouthness of form which the corset and other fashionable modes of torture have induced, and by their aid to approach as far as possible to the ideal figure, which, in its native grace and beauty, requires no such accessories.

When men and women recognize the body as a sacred temple given them to care for as a most pre-

cious treasure, the first question which is asked in relation to dress will not be, "Is this garment in fashion? Is it the latest style?" but, "Will it answer the demands of modesty and protection without in any way interfering with any bodily function?" The wearing of a dress which in any way deforms the body or interferes with any vital process, is a sin against Heaven, is nothing more nor less than a defacing and profanation of the temple of the Most High. For a woman to undertake to improve upon the handiwork of God by changing the shape of her body regardless of the effects upon those delicate and marvelous organs which are placed within the trunk, and in which daily and hourly miracles of creation and transformation are wrought in carrying forward the various processes of life,—for any person to presume to improve upon the masterpiece of the Great Artist which he himself pronounced very good, is an affront, an insult to the Creator. It is a duty which every woman owes to herself, to the race, and to God, to thoroughly inform herself upon the question of healthful dress, and to lay aside at once and forever all waist-constricting bands, corsets, belts, and other trammels, and to clothe herself with such garments as shall be thoroughly in harmony with physiology and common sense.

CARE OF THE EYES.

Use of the Eyes.—The effort to accommodate the eye in looking at near objects requires the action of several muscles, which must continue to act so long as the sight remains fixed on near objects. When the effort is long sustained, these muscles become weary, and when not given proper opportunities for rest, they may become seriously diseased. If the eyes are easily tired, and can be used but a short time without a blurring of vision or aching of the eyeballs, it is probable that there is some serious defect, and an oculist should be consulted.

Never try to read or do work requiring close application of the eyesight in a poor light. In doing so, the book or other object must be brought too near the eye, and thus near-sightedness may be acquired.

In reading, have the light come over the shoulder, the left if convenient, and avoid using the eyes in a glaring light as much as possible.

Never expose the eyes to a sudden bright light when it is possible to avoid doing so. After the eyes have been closed for some hours, some little time elapses after they are opened before they are fully accustomed to the light. On this account, it is not well to employ the eyes in reading immediately on waking in the morning.

Reading in the cars is injurious to the eyes on account of the shaking which continually changes the distance between the book and the eye, and thus taxes most severely the organs of accommodation.

Wearing Glasses.—When glasses are needed by old persons, they should be worn, not necessarily all the time in all cases, but when specially needed, as in reading, doing fine work, etc. Persons who are near-sighted should avoid wearing too strong glasses, as this will increase the defect.

Glasses should enable a person to read with ease at eight to twelve inches from the eye. An old person who cannot see well without slipping his glasses down upon his nose, should obtain stronger glasses.

Eye Lotions.—The common use of the numerous domestic and patented eye washes is a frequent cause of serious disease of the eye. When the eyes are simply irritated by excessive work, a cold, exposure to dust, or any similar cause of irritation, frequent bathing with tepid water, or rest with a thin cloth wet in tepid water laid over the eyes, is a good and harmless remedy. If the case is not speedily relieved by some simple measures of this sort, consult a competent physician at once.

Things in the Eye.—Dirt in the eye, if visible, may usually be removed by a corner of a folded handkerchief, or by the end of the finger previously moistened with oil. If out of sight under the lids, a loop of hair passed under and withdrawn will generally bring it out. A piece of steel or other sharp substance which has become imbedded in the eyeball, should never be left to work out, but a competent surgeon should be consulted at once.

If lime or any other alkali has gotten into the eye, bathe with water at once, and as quickly as possible apply a weak solution of vinegar, using about a tablespoonful of vinegar in half a glass of water.

Inflammation of the eye, if attended by great pain, intolerance of light, or a mattery discharge, demands the attention of a skilful physician.

Catching Eye Diseases.—All inflammations of the eye, attended by a discharge, are contagious by contact; and persons suffering in this way should never use the same wash-basin or towel used by others, and should sleep alone. Neglect of this rule sometimes allows a dangerous disease of the eye to extend through a whole school or institution.

Squint is an affection of the muscles of the eye. If the muscles which turn the eyes inward contract more strongly than the opposite muscles, the individual is "cross-eyed." If the outer muscles contract the more strongly, the eye turns out, and the individual is said to be "wall-eyed."

Wild Hairs.—Sometimes the eyelashes grow in a scattered manner, and turn inward toward the eyeball, causing great irritation. These are commonly called *wild hairs.* If persistently pulled out, they sometimes cease to grow, although the only certain cure is by a surgical operation.

Education of the Eye.—It is well known that savages and foresters generally possess much more acute vision than other persons, often being able to see clearly at long distances objects which are wholly invisible to others. This is undoubtedly the result of education; and it is quite certain that careful training of the eye in discerning objects at a distance would greatly increase its usefulness, and counteract the increasing tendency to short-sightedness which is becoming so marked among civilized nations as to excite considerable alarm.

HOW TO CARE FOR THE EARS

Observe the following rules respecting the care of the ears:

Never clean the ears with a pick or with the twisted end of a towel. The earwax dries up, and falls out of itself. Efforts to keep the ear free from wax increase the difficulty by irritating the membrane, and causing it to make more wax.

Never allow cold water to enter the ears, and do not let a cold wind blow into them. If they must be exposed to cold air or to water, protect them by a little wad of cotton placed in the ear. Care should be taken to remove the cotton when it is no longer needed. Much mischief sometimes results by leaving portions of cotton or paper in the ear.

If a seed or other foreign substance has gotten into the ear, do not try to remove it by introducing a knitting-needle or by any similar means. The only safe plan is to syringe the ear with warm water, leaning the head to one side so that the object may drop out if loosened. If a pea or bean has been in the ear so long that it has swelled, and hence cannot be dislodged by the syringe, it may be contracted so that it will fall out by holding alcohol in the ear for a short time.

If an insect gets into the ear, pour in a little oil, which will suffocate it, when it may be removed by syringing.

Shouting into the ear may cause deafness. This is true of any loud or unexpected sound. Such sounds are liable to cause rupture of the drum head, which may be some time in healing, and may leave the hear-

ing permanently impaired. When a loud sound is expected, the ear is prepared for it by loosening of the drum head. It is also well to keep the mouth closed and to cover the ears.

Earache may usually be allayed, if given early attention, by applying flannel cloths wrung out of water as hot as can be borne. This common complaint among children is often the result of a cold, and if it occurs frequently, may cause permanent deafness.

Partial deafness is much more common among children than is generally supposed, and a child should not be punished for inattention until its ears have been carefully tested by stopping each one in succession, and testing the other by speaking to the child at a distance while the eyes are covered. A person is often able to hear well when giving close attention; but when not expecting to be spoken to, will hear nothing.

Boxing and pulling the ears are barbarous practices, which often cause loss of hearing, and sometimes disease of the ear which proves fatal.

A cold in the head often causes partial loss of hearing for a few days, due to obstruction of the Eustachian tube. If often repeated, permanent deafness may result.

Discharge from the ears is usually the result of an inflammation of the middle ear with rupture of the drum head. Such a case should never be neglected. Consult a physician at once.

Never put chloroform or laudanum in the ear for relief of toothache.

The use of tobacco in any form often leads to deafness by causing disease of the throat, which leads to

ear diseases. The same may be said of the use of liquors.

Tea and Coffee.— The widespread use of these popular beverages is undoubtedly responsible for much of the nervousness and a considerable share of the dyspepsia so common among civilized people. For many years, the use of these narcotics was considered harmless, by physicians as well as by the laity; but in recent years, many eminent physicians have become aroused to the fact that both tea and coffee are productive of much harm, and are protesting against their use. The active principle of both tea and coffee is a narcotic poison, a few grains of which will produce almost instant death when given to a cat or dog. Indeed, so small a quantity as twelve grains of this poison have been known to produce very dangerous symptoms in a strong man; and cases are on record in which persons have been made insensible by the drinking of strong tea.

Some years ago, a case was reported in which an English physician lost a fine horse through the carelessness of the groom, who allowed a small quantity of tea to become mixed with the grain which was fed the horse. The horse died with all the symptoms of narcotic poisoning. There is enough of this poison in a single ounce of tea to produce dangerous symptoms.

Coffee contains some less of the poison, but this does not diminish the harm arising from its use, as a larger quantity of coffee is usually employed than in the use of tea. In addition to this active principle, known as *theine* or *caffeine,* both tea and coffee con-

tain *tannin,* which injures the stomach by contracting the blood vessels, and otherwise impedes digestion by precipitating the pepsin of the gastric juice.

Persons who use tea and coffee are subject to nervous trembling of the hands, headache, defective vision, and various other disturbances which indicate too clearly the poisonous character of these narcotics to leave any room for doubt respecting the propriety of their use. Both tea and coffee are particularly injurious to children, and wise parents, even though themselves wedded to their cups, will certainly withhold them from their children.

Drugs.—Great harm is done by the indiscriminate and wholesale use of drugs, which is so common at the present time. There are very few drugs which are not more or less poisonous in character, and the majority are deadly, except when taken in small doses. Those who use drugs should recollect that they are harmful, not only in large doses, but in small doses, when long continued. Quite a large proportion of common remedies, such as quinine, "blood purifiers" of all sorts, bromides, iodides, etc., are productive of much harm unless scientifically used. An immense amount of injury is done by the use of patent medicines, nearly all of which are composed of harmful ingredients, and which, so far as our observation goes, which is quite extensive, are capable of doing great mischief.

It is a favorable omen that the better class of physicians, especially those who have had the advantage of a course of medical study in European hospitals, where they have the opportunity to watch the prac-

tice and listen to the teachings of the highest medical authorities in the world, use drugs far less freely than formerly. More reliance is placed upon proper diet and attention to the general habits of life; to the removal of the causes of disease, rather than the mere mitigation of the symptoms. There is no question but that diseases have been vastly multiplied by the multiplication of medicinal remedies. In a community where doctors are plenty, drug diseases are generally almost as numerous as disorders which arise from natural causes.

Rules for Dyspeptics.—A few years ago we formulated for dyspeptics a few rules, which we give below, publishing the same in our little work, "Digestion and Dyspepsia." Subsequently we printed the same in our journal, *Good Health*. A short time later they came back to us as an editorial in a popular magazine, published in London, and edited by an eminent physician, a member of the Royal Society. We feel highly complimented that our English friend is willing to give so hearty an indorsement of our views on this subject as to be willing to have them appear as his own. The following are the rules:

1. Eat slowly, masticating the food very thoroughly, even more so, if possible, than is required in health. The more time the food spends in the mouth, the less it will spend in the stomach.

2. Avoid drinking at meals; at most, take a few sips of warm drink at the close of the meal, if the food is very dry in character.

3. In general, dyspeptic stomachs manage dry food better than that containing much fluid.

4. Eat neither very hot nor very cold food. The best temperature is about that of the body. Avoid exposure to cold after eating.

5. Be careful to avoid excess in eating. Eat no more than the wants of the system require. Sometimes less than is really needed must be taken when the digestion is very weak. Strength depends not on what is eaten, but on what is digested.

6. Never take violent exercise of any sort, either mental or physical, just before or just after a meal. It is not good to sleep immediately after eating, nor within four hours of a meal.

7. Never eat more than three times a day, and make the last meal very light. For most dyspeptics, and for nearly all adults, especially business and professional men, two meals are much better than three.

8. Never eat a morsel of any sort between meals.

9. Never eat when very tired, whether exhausted from mental or physical labor.

10. Never eat when the mind is worried or the temper ruffled, if possible to avoid doing so.

11. Eat only food that is easy of digestion, avoiding complicated and indigestible dishes, and taking but one to three kinds at a meal.

12. Most persons will be benefited by the free use of granose and similar cereal preparations, though many will find it necessary to avoid vegetables, especially when fruits are taken.

COMMON AILMENTS

A LARGE share of the accidents and ailments to which men and boys are subject may be successfully treated by a few simple remedies, and by the aid of appliances which may be found in every household. Many of these ailments are, from their apparently trivial nature, apt to be neglected, as the result of which they not infrequently give rise to very grave conditions, and become a cause of much suffering and inconvenience. Hence, information respecting the nature of ailments which are of such frequent occurrence, is of too great importance to be overlooked in a work of this character; and the knowledge of the simple means by which they may be relieved, is well worth the space which is devoted to the subject in this chapter.

CHRONIC INFLAMMATION OF THE THROAT. OR PHARYNGITIS

Symptoms.—Slight pain in swallowing; granular appearance of the throat; elongation of the palate; tough, tenacious mucus, occasional hawking and spitting; "hacking" or "hemming" cough; husky voice; expectoration of small, cheesy or calcareous masses; slight hemorrhages from the throat in the morning.

Causes.— This disease is most commonly the result of repeated attacks of acute pharyngeal catarrh, though it not infrequently arises insidiously. The individuals most subject to the disease are those addicted to the use of liquor, tobacco-users, persons of sedentary habits, and those exposed to an atmosphere charged with dust or irritating gases. A humid atmosphere and changeable climate favor the production of this disease. Males are more frequently affected than females. It is found in its worst form in persons of vicious habits. What is known as clergyman's sore throat is a form of this disease, and it is undoubtedly the result of the sedentary habits of this class of persons. Diseases of the stomach and liver are frequently causes of pharyngeal catarrh. Bad dietetic habits are an important factor in the production of this disease. The use of mustard, pepper, vinegar, pepper-sauce, ginger, and various other condiments, and the excessive use of salt, sugar, fats, and animal food, must be set down among the principal predisposing causes of this form of the disease. In this way the terms "stomach cough" and "liver cough" have arisen, the stomach being really the remote cause of the cough, the direct source of which is the irritation in the throat. The most annoying symptom of chronic pharyngitis is the hacking or "hemming" cough, which is sometimes very harassing. The cough arises in some cases from the irritation of the soft palate, and in others from the elongation of the palate. When the palate becomes so long that the end rests on the back part of the tongue, it is very likely to cause a most annoying cough, and efforts at expectoration.

Treatment.— The avoidance of all causes of the disease is of the greatest importance. The patient should adopt a plain, simple dietary, avoiding condiments, the use of fats, sugar, pastry, and all stimulating and clogging foods. If the patient has been addicted to the use of alcoholic liquors or tobacco in any form, these habits must be at once abandoned. Every possible measure should be taken to build up the general health by frequent bathing, keeping the skin in an active condition, as well as by out-of-door exercise and careful regulation of all the habits. Every night, before going to bed, apply a cold compress to the throat, and cover with a flannel. Remove in the morning, and bathe the parts with the hand dipped in cold water. Dry thoroughly, and in cold weather apply a little oil to the neck.

Apply daily to the throat, by means of a swab, some astringent application, as tannin and glycerin, or alum and glycerin, in the proportion of one dram of either to the ounce of glycerin. In cases in which there is great dryness of the throat, astringent applications are not required. Some simple stimulating application, as gargling salt water, a teaspoonful to the pint, or a solution of chlorate of potash, will be found useful. In cases in which the throat presents a granular appearance, the galvano-cautery in the hands of a specialist is often required for a perfect cure.

ENLARGED TONSILS

Symptoms. — Sensation of a lump in the throat upon one or both sides; difficulty in swallowing, in extreme cases; voice changed, patient often being unable to pronounce certain words; great susceptibility to "cold in the throat;" constant irritation in the throat; in many cases, impairment of hearing.

The enlargement is sometimes confined to one side, but frequently both tonsils are affected. In some cases the enlargement is so great that the passage through the throat is almost entirely obstructed. We have frequently had cases in which the two tonsils came in contact, so great was the enlargement. Sometimes the enlargement is produced gradually. This is especially the case in scrofulous children. The results of enlarged tonsils are more serious than are generally supposed. They not only occasion permanent injury to the voice, giving it a nasal character on account of the partial paralysis of the soft palate, preventing complete closure of the passage to the nasal cavity, but not infrequently occasion serious injury to the middle ear from inflammation of the Eustachian tubes.

Treatment.—In cases of moderate enlargement, the treatment described for chronic pharyngitis may be given with success. Where the enlargement is very great, there is no remedy but removal. The operation is a trivial one, and should be resorted to promptly when its necessity becomes apparent.

In cases of moderate enlargement of the tonsils, and those in which the patient objects strongly to removal by the tonsillotome, the tonsil may be removed by the application of the galvano-cautery.

NASAL CATARRH

Chronic catarrh is not, as many persons suppose, a chronic inflammation of the part affected, but is a congestion, usually of a passive character. The blood vessels of the affected membrane are greatly relaxed, and turgid with venous blood. The constant pressure of blood induces an excessive secretion, and the premature death of the covering cells. The secretion decomposes, and becomes acrid, increasing the irritation, and ultimately causing ulceration. The excessive blood supply of the membrane occasions swelling and abnormal growth. The membranes lining the nasal cavity and other portions of the respiratory tract become thickened, and various unhappy results follow.

Causes.— Among the most active of all exciting causes of catarrh of the nose and throat, is what is popularly known as taking cold. "A cold in the head" is essentially a slight fever accompanied by an acute inflammation of the mucous membrane lining the nasal cavity.

A cold is usually looked upon as a very trifling affair, which scarcely needs serious attention, as it will work off of itself in a few days. This is really a grave error. Neglected colds are the most common cause, not only of catarrh of the nose and throat, but not infrequently of still more grave diseases, as chronic laryngitis and consumption. At best, a neglected cold leaves behind it an increased susceptibility to taking cold, so that another is contracted much more easily than the first; and this susceptibility to taking cold

is increased until finally a very slight exposure, which would be in fact no exposure at all to a healthy person, will be sufficient to induce a severe cold, which may last for weeks, or even months. After a time, indeed, the susceptibility becomes so great that no exposure whatever is required to cause the individual to take a cold. A change of a few degrees in the barometer, or a slight variation in the temperature of a room, or a change in the direction of the wind, may be sufficient to bring on a fresh attack.

Thus what was at first only an occasional occurrence, colds being contracted only at long intervals, becomes, on account of serious exposure, a practically continuous condition, and a simple cold has resulted in a chronic catarrh. The frequent inflammation of the nasal membrane has caused its blood vessels to become relaxed and dilated to such an extent that the condition is permanent, and the membrane is constantly congested, thus occasioning a too profuse secretion of mucus on the part of the glands situated in the membrane, and a too rapid exfoliation, or shedding, of the epithelial cells covering the membrane.

It may be well to consider some of the ways in which persons contract colds. In general, it may be said that a cold is occasioned by some violation of the laws relating to health, particularly those relating to the proper clothing of the body. The majority of bad colds are contracted in the spring and fall, as at these seasons of the year people are apt to be most careless in regard to the proper protection of the body. Many persons neglect to put on an extra suit of warm underclothing sufficiently early in the fall to avoid an early

cold; and probably an equally large number commit a similar error in leaving off the warm woolen undersuits too early in the spring, and before the weather has become settled. In this climate, the weather can scarcely be considered settled before the first of June; indeed, in some seasons the weather does not seem to be settled at all. A "cold snap" will sometimes occur in July and August, which creates as great a necessity for additional underclothing as the approach of cold weather in late autumn. The only safe plan in relation to clothing is to wear woolen drawers and under-vests the year round. Some prefer a mixture of wool and cotton, and, as a rule, such a fabric is more agreeable to the skin than pure wool. The summer suits may be as thin as desired; in winter, very heavy suits should be worn, and in severe cold weather, two or three suits. The clothing should be carefully adapted to the weather. Extra cold weather in winter, and an extra exposure to the cold, call for one or two extra suits of underclothing; and a cold spell in midsummer creates a still more urgent demand for extra clothing than a similar change in winter, as warm weather produces a condition of the skin which is not so well prepared to defend itself against the cold as when it has been accustomed for some time to a lower temperature.

The clothing of the head is a matter of special importance. Men, as a rule, protect their heads by warm fur or felt caps or hats; but women are generally so enslaved by fashion that health is sacrificed for the sake of gratifying the perverse taste for displaying a fashionable bonnet, which cannot be considered

as in any degree a protection to the head, being at best merely an ornament. Both the head and the neck should be sufficiently protected to prevent chilling. The wearing of heavy fur scarfs and mufflers is, however, a practice to be condemned, as the amount of heat thus induced is so great as to produce perspiration, and, as a result, increased liability to colds. Woolen wrappings for the throat possess the advantage of being pervious to the air, and consequently less liable to excite undue activity of the skin. The throat should not be enveloped in so many folds as to occasion an excessive degree of heat.

The practice of cutting the hair of men and boys very short, which has been much in vogue in recent years, must also be condemned as in the highest degree productive of catarrhal affections. The hair is intended as a protection to the scalp, and should be left sufficiently long to serve its purpose. No less to be condemned are the enormous masses of hair sometimes worn by ladies, which overheat the head, and injure the scalp by their great weight.

Too great stress cannot be laid upon the importance of proper clothing of the feet and lower limbs. Thin-soled shoes are scarcely better than no shoes at all, as they rapidly conduct the dampness through to the feet. The sole of the foot is very largely supplied with nerves, and is one of the most sensitive portions of the body. It is on this account that a cold is contracted more rapidly by wetting or chilling the feet than by similar accidents to most other portions of the body. The shoes should be thick and warm, with heavy soles, and rubbers should be worn during wet weather, or

when the shoes come in contact with moist surfaces. The wearing of rubbers or waterproof overshoes constantly is not a healthful practice, however, as the moisture escaping from the surface of the feet is retained, so that they become wet, and injury may result as readily as though they were wet in any other way.

Somewhat extended opportunities for observation have led us to the conclusion that an inactive state of the liver has some influence in predisposing an individual to catarrh. We have observed that a torpid liver is, in the majority of cases, associated with nasal catarrh; and chemical examination shows that the discharges of the nasal cavity of a person suffering with catarrh contain a considerable quantity of cholesterine. The influence of diet, as the excessive use of fats, sugar, condiments, and numerous other unhealthful articles, in predisposing to catarrh, is unmistakable. Sedentary habits, by lowering the vital tone and lessening the resisting power of the individual, are predisposing causes which should be mentioned.

Symptoms.—The symptoms of acute nasal catarrh, or cold in the head, are too familiar to most persons to require more than a very brief description. The usual symptoms are chilliness; lassitude; pain in the forehead; a watery discharge from the nose, which becomes yellowish and thick after two or three days; feverishness; coated tongue; and loss of appetite. The eyes are also frequently affected, being in most cases red and congested, and often suffused with tears. Frequently repeated acute catarrhs may finally give rise to chronic catarrh; however, the latter sometimes develops gradually, without being directly traceable to acute colds in the head.

Chronic nasal catarrh, with which we are chiefly concerned, presents varied symptoms in its different stages. In the first stage of the disease, which is usually known as simple chronic nasal catarrh, the symptoms are similar to those experienced in the last stages of acute cold in the head. There is a more or less copious discharge from the nose, either through the nostrils, requiring the frequent use of the handkerchief, especially in the morning, or through the passage to the throat at the back of the nasal cavity, as indicated by a dropping at the back of the throat. The patient suffers more or less with a dull pain over the eyes, in the cheek bones, or at the back of the head, which is increased in damp weather or whenever a slight cold is taken.

After a time the long-continued congestion and irritation of the nasal membrane gives rise to swellings and permanent thickenings of the mucous membrane and tissues underlying it in various parts of the nose, in consequence of which the several passages through the nose are more or less obstructed, so that breathing is interfered with, especially during sleep. On falling asleep, the patient involuntarily opens his mouth, not being able to secure a proper amount of air through the obstructed nostrils without the aid of the voluntary effort which he habitually makes during waking hours. The obstruction of the nasal passages is also indicated by a decidedly nasal tone in the voice, or, rather, absence of nasal resonance in the voice, giving the voice the peculiar qualities produced by speaking with the nose closed. A similar swelling and enlargement occurs in certain glands at the foot of the phar-

ynx, or point at which the nasal cavity and the pharynx unite, known as the pharyngeal tonsil. This enlargement sometimes becomes so great as to almost wholly obstruct the passage between the nose and the throat. We have met with cases where the opening, which is usually capacious, was not much larger than a goose quill. The obstructions produce especially during sleep various abnormal sounds in breathing. Snoring is always indicative of some obstruction of this sort.

Changes in the form of the nose also occur. The abnormal quantity of blood supplied to the mucous membrane lining the nasal cavity occasions an abnormal development of all the tissues; and an enlargement and thickening of the upper part of the nose occurs, and also, in many cases, an elongation of the septum of the nose, the cartilaginous extremity of which often becomes turned to one side. Very frequently, also, the central position of the septum deviates to one side, producing obstruction of the passage upon that side of the nose. Abnormal growths also appear in the nasal cavity, such as mucous and fibroid polypi, cartilaginous points sometimes appearing as rounded prominences and in others as long ridges projecting from the vomer, either directly outward or downward. We have frequently met cases in which nearly the whole nasal cavity was an abnormal growth of this kind. At the time of this writing we have under treatment a patient from whose nasal cavity we have, within the past few weeks, removed eight polypi, most of which were of considerable size, and obstructed the nasal passages in such a manner as to make breathing through the nose impossible.

In many cases of catarrh, especially in those in which the disease has advanced so far as to produce abnormal growths and permanent enlargement of the structures within the nasal cavity, the disease is accompanied by an offensive odor. The breath at times becomes very foul, and the patient may be easily led to believe that extensive destruction of the tissues in the nasal cavity is taking place. This is due to the accumulation of secretions in the nasal cavity, which, on account of the numerous obstructions, cannot be thoroughly cleansed, either through the anterior or posterior openings, and in consequence of long retention the catarrhal secretions undergo decomposition, giving to the breath a peculiar and offensive odor, characteristic of this stage of the disease.

Dry Catarrh.—This state of things may continue for a few days or for a large part of a lifetime. Sooner or later, however, in the majority of cases, a still more advanced stage of the disease is reached, which is commonly known as dry catarrh. In this form of the disease, there is deficient activity of certain of the glands of the nose, due to atrophy or obstruction of the glands from long-continued pressure on account of the thickening and abnormal growths already described. There are two kinds of glands in the nasal mucous membrane, one variety producing a thick, viscid mucus, the other, a liquid serum. The latter glands are destroyed first, so that the viscid mucus, which is not sufficiently fluid to escape through the passage of the nose, adhering to the surface of the mucous membrane, quickly dries, forming scabs, which soon putrefy, and produce an exceedingly bad odor. In some cases,

the odor of the breath is so intensely fetid as to produce loss of appetite and great impairment of the general health.

The patches of putrid mucus adhering to the mucous membrane produce excoriations, finally resulting in ulceration, which may even penetrate to the bony and cartilaginous structures of the nose, and thus occasion loss of the septum of the nose, and destruction of some of the bony prominences which project into the nasal cavity from the bones of the face. In this form of the disease, the patient usually experiences relief from some of the distressing symptoms suffered during the early stages of the malady. The obstruction to the nasal breathing is removed, and the various abnormal thickenings gradually shrink away, until the passage through the nose becomes so wide that the back of the throat can be easily seen through the nostrils. Patients of this class frequently remark that they suffered greatly with catarrh in early life, but have outgrown it, and wish treatment simply for the removal of the bad odor from the breath, to which their attention has usually been called by friends, it being generally the case that when the disease has advanced so far as in this class of cases, the sense of smell has been almost or entirely destroyed through the same destructive processes which have removed the thickening and swellings which occurred in the earlier stages of the disease.

The effects of nasal catarrh are not entirely confined to the nasal cavity. The irritating discharges dropping down into the throat occasion gradual extension of the disease into the pharynx, causing thick-

ening of the mucous membrane of this part, hypertrophy of the tonsils, and elongation of the palate, which produces irritation of the throat, unpleasant tickling sensations, and a variety of other sensations of an unpleasant character. It also extends farther downward into the larynx, causing hoarseness and weakness of the voice, and occasionally its entire loss.

Treatment.—The treatment of nasal catarrh has afforded a rich field for quacks, and has been a source of almost infinite annoyance to physicians. It is only in recent years, and since the subject has been taken up by scientific specialists, that the disease has been managed in anything like a successful manner. We have no universal panacea. The disease is one which possesses individual peculiarities to a very large extent, and can be successfully treated only by a careful adaptation of remedies to individual cases. In the first place, we must condemn utterly the use of any of the popular catarrh specifics, inhalants, etc. These remedies are usually such as have proved successful in a few instances, and will benefit a certain proportion of cases, but are quite as likely to do harm to a larger number. The various popular nostrums advertised for the cure of catarrh are composed of substances which have been well known to the medical profession for years, and possess no such mysterious specific virtues as are attributed to them.

We shall notice the treatment of the various forms of catarrh in the same order in which they have been described, beginning with the simplest form, an acute catarrh, or "cold in the head."

How to Treat a "Cold in the Head."—To be successful, the treatment must be begun almost as soon

as the cold is contracted. When an acute catarrh has already existed for two or three days, it is of no use to attempt abortive treatment, for the disease must run its course, although proper treatment will abridge the natural course of the disease, which is from three to six weeks.

If by exposure to cold air or draft while the body is in a state of perspiration, by wetting the feet, or by similar means, the circulation has been disturbed, producing sneezing, snuffles, a stuffed feeling in the head, "watering" of the eyes, and a watery discharge from the nose (the usual symptoms of coryza), the patient must at once resort to some means to restore the circulation, and produce a proper activity of the skin, so as to withdraw the excess of blood from the mucous membrane of the nasal passages. An alcohol sweat, a vapor bath, a wet-sheet pack, a Turkish or Russian bath, or even a hot full bath, or any means by which vigorous activity of the skin may be induced, will be effective.

After taking treatment of this sort, however, it should be recollected that considerable danger is incurred, since the disturbed condition of the system, which involves the nervous system as well as the circulatory apparatus, renders the person much more liable to make large accessions to the cold already contracted, than before the cold was contracted. The following plan is one well suited to home treatment:

Within an hour or two of the time the first symptoms of the cold appear, let the patient drink copiously of some hot drink, which may be simply hot water, or weak hot lemonade, or diluted infusions of catnip,

peppermint, or almost any one of the numerous domestic remedies used for this purpose. From two to three pints of hot water should be taken in the course of an hour or two. During the water drinking, some one of the various forms of hot bath mentioned should be taken, so as to produce vigorous perspiration, which will be aided by the hot-water drinking. After the bath, the patient should immediately go to bed, covering up warm with woolen blankets, so as to continue the activity of the skin in a moderate degree for several hours. If the bath is taken at night, the patient should receive, the next morning, a salt-rub, which consists in rubbing the whole surface of the body with common salt, mixed with water to the consistency of mush.

After the rub, the body should be sponged with tepid water so as to remove the salt, and then rubbed dry. The delightful smoothness of the skin which is produced by this means will be sufficient inducement to repeat the bath at sufficiently frequent intervals to overcome the susceptibility to chilling. The body should be rubbed with olive or cocoanut oil after the bath. Vaseline may be used in the absence of anything better. When a full sweating bath cannot be taken, a thorough sweat can sometimes be produced by a hot foot bath and copious hot-water drinking, followed by a few hours in bed, wrapped in warm blankets.

The unpleasant sensation in the nose and head can be best relieved by sponging or bathing the face with hot water, applying a fomentation to the forehead or back of the head when there is pain in these parts, and snuffing up the nostrils a solution of common salt

in water, a teaspoonful to the pint. The temperature of the water should be at least 105° or 110°, or as hot as can be borne without discomfort. When the throat is sore, a fomentation or hot sponging should be applied to the throat, to be followed by a cold throat pack to be worn all night.

When the cold has continued two or three days, so that there is a thick, yellow discharge from the nose, and dropping at the back of the throat, the treatment must be such as will be recommended for simple chronic catarrh.

Treatment of Simple Chronic Nasal Catarrh.— This is by far the most common of all forms of nasal catarrh. It is chiefly characterized by the thick, yellow discharge which necessitates the frequent blowing of the nose, and the use of the handkerchief, or clearing from the throat the thick mucous discharges which are constantly dropping into it from the back part of the nasal cavity. Either or both of these prominent symptoms may be present, according as the disease is chiefly located in the anterior or posterior part of the nasal cavity, or throughout the whole extent of the nasal mucous membrane. Other symptoms of this form of the disease which we have previously described, we do not need to recapitulate. The examination of the nasal mucous membrane by means of instruments for the purpose, shows the affected portion to be red and swollen with congestion, and covered more or less with a thick yellow discharge which is characteristic of this stage of the disease. The indications for treatment are two: (1) To cleanse the diseased mucous surfaces; and (2) To apply such remedies as will remove the

congestion, and induce a healthy action in the mucous membrane.

Cleansing of the Nasal Cavities.— For this purpose a solution is required which will not irritate the mucous membrane, and at the same time will possess the property of dissolving the nasal mucus. Pure water will answer neither of these purposes. The fluid naturally secreted by the nasal mucous membrane is slightly saline. When pure water is injected into the nasal cavity, it is absorbed too rapidly by the mucous membrane, so that it becomes quickly swollen, producing pressure upon the sensitive nerves, thus giving pain. The addition of a small quantity of common salt or carbonate of soda increases the specific gravity of the water, giving it more nearly the character of the normal nasal fuid. The amount of salt required to produce a solution most nearly corresponding with the natural fluid, is one dram, or an even teaspoonful, to a pint of water. Both common salt and carbonate of soda, especially the latter, possess the property of dissolving with readiness the nasal mucus. Borax also possesses this property to some degree. These substances, therefore, are the proper ones for use in making the solution. The following formulæ are thoroughly satisfactory:

1. Common salt, an even teaspoonful; soft water, warm, one pint. To be used in cases in which there is only a small quantity of discharge.

2. Common salt, one-half teaspoonful; carbonate of soda, one-half teaspoonful; soft water, warm, one pint. To be used in cases in which there is an abundant discharge.

3. We frequently add glycerine to either or both of the solutions in the proportion of an ounce to the pint of the solution.

Another very effective method for cleansing the nasal cavity, is by means of the atomizer. The atomizer produces a coarse spray with considerable force, and is best for this purpose. The spray should be directed into each nostril in various directions to insure cleansing of the entire surface, and in cases requiring it, may also be directed behind the soft palate, thus cleansing the back part of the nasal cavity also.

Having cleansed thoroughly the nasal cavity by some one of the various methods, we are now prepared to apply a medicated solution for the purpose of relieving the chronic congestion of the membrane, and inducing a more healthy action. In cases of simple catarrh, the thorough application of the cleansing solution alone is often sufficient to effect in time an entire cure.

Hay-Fever. — Dr. Morell Mackenzie writes as follows respecting the management of this very eccentric and annoying malady:

"The treatment of hay-fever is by no means satisfactory, and in no disease is the old adage, that 'prevention is better than cure,' more truly applicable than in the case of this complaint. If the poison be continually introduced into the system, the antidote, if one exists, can have but little chance of effecting a cure. The first measure, therefore, must be to remove the patient from a district in which there is much flowering grass. A sea voyage is probably the most perfectly satisfactory step that can be taken. Patients who are

unable to go to sea should endeavor to reside on the coast, where they will generally be free from their troublesome complaint, except when the land-breezes blow. Dwellers in towns should avoid the country, and those who reside in the country should make a temporary stay in the limits of a large town. It often happens, however, that such a change of abode is not practicable; and under such circumstances, if the complaint be very severe, the patient should, if possible, remain indoors during the whole of the hay season. Many persons, of course, cannot keep in the house during the month or six weeks of the hay-fever period; and those who can are apt to find such detention not only irksome, but very injurious to the general health. If, therefore, a patient be obliged to go out of doors, he should plug his nostrils with cotton-wool or wadding, and should defend his eyes by wearing spectacles with large frames, accurately adapted to the circumference of the orbits. Plugging the lachrymal ducts with small glass rods has also been recommended, and Thorowgood speaks favorably of a little apparatus containing a few drops of camphorated or carbolized solution, which can be comfortably worn in the nostrils. Instead of *plugging* the nose, it has been advised to close it by compression with a little metal clip. As rapid motion in the open air almost always aggravates the complaint, it may be advantageous to wear a veil over the face while driving. One made of 'three ply' of fine silk gauze has been found very useful. It is recommended that it should be made in the form of a bag open at both ends, one end fitting round the hat, while the other has attached to it a heavy wire ring

about ten inches in diameter, which lies on the shoulders, and keeps the veil off the face. Those who do not mind being occasionally mistaken for the 'veiled prophet of Khorassan,' will, no doubt, adopt this plan. Protected in this way, many people predisposed to hay-fever escape altogether, while others contract the affection in a very mild form."

The unhappy victim of hay-fever who has to undergo the operation of having his nose stopped with cotton-wool, his lachrymal ducts plugged with glass rods, and his eyes encased in goggles, would undoubtedly be glad to wear a veil to hide his face from the curious gaze of the cruel public, and is certainly to be pitied; nevertheless, we have seen decided advantage gained by following the suggestion to plug the nostrils with cotton and protect the eyes when riding or walking in the open air.

We would add another measure of prevention not mentioned by the distinguished writer from whom we have quoted. Our observation has been that persons who suffer the most severely with hay-fever are invariably those who are subject to catarrh during other seasons of the year, usually in a chronic form, as a result of which the mucous membrane of the nose is in a swollen and thickened condition, obstructing the nasal passages to a greater or less degree. A slight additional irritation, such as the cause of hay-fever produces, is sufficient to produce almost complete obstruction of the nose; and through reflex action, spasm of the air tubes of the lungs is produced, making breathing difficult, and often occasioning most aggravating distress.

There are always to be found in these cases certain sensitive points in the nasal cavity which may be treated by galvano-cautery applications in such a manner as to overcome the hyper-sensitiveness which gives rise to the distressing symptoms of the disorder.

Moist Tetter, or Salt-Rheum. — This disease is essentially catarrh of the skin. Its characteristics are too well known to require description. It is a scaly disease of the skin, usually attended by intense and persistent itching. The itching is generally most thoroughly relieved by hot bathing of the parts. If the hands or feet alone are affected, they may be soaked in water as hot as can be borne, several times a day, for ten or fifteen minutes, and on removal, a little olive-oil or cocoanut-oil should be applied, so as to protect the surface from the air. Sponging the parts with water in which bicarbonate of soda has been dissolved in the proportion of one large teaspoonful to the pint of water, is a good means of affording relief. In advanced cases, in which the skin has become dry and thickened, with a tendency to crack, the use of an unguent of equal parts of zinc ointment and tar ointment is probably the most effective application which can be made. This preparation is much used in the skin hospitals of New York City and by specialists.

Warts.—Warts are due to excessive growth of the papillæ of the skin. They occur most frequently upon the hands of young persons. They are occasionally seen upon the face. The idea that warts are contagious has little foundation. Warts of the face are liable to degenerate into cancers.

Treatment.—After thoroughly oiling the skin about the wart, touch it with the end of a stick dipped in

nitric acid. Acetic acid may also be used for the same purpose. The application should be repeated every few days until the wart is destroyed. Warts sometimes disappear very suddenly, which has given rise to the idea that they may be driven off by various maneuvers supposed to possess the power of dispersing them in a magical manner.

Granular Sore Eyelids.—This very common affection is many times the outgrowth of a feeble state of the body, and is not infrequently the result of repeated inflammation of the lids. It sometimes results from a single attack of granular conjunctivitis. It ought to be known that the disease is somewhat contagious. It is often communicated through the medium of a common towel in families and boarding-schools. It cannot be contracted, as many people suppose, by simply looking at a person suffering with sore eyes.

One of the most efficient remedies is the hot water spray applied locally, or laving the eye with hot water. The temperature should be as hot as can be borne without discomfort, the application being continued ten or fifteen minutes, and made twice a day. We have seen cured, by this treatment alone, very obstinate cases of many years' standing, which had resisted many other methods of treatment. Consult a good oculist.

Nettle Rash, or Hives.—This is a nervous affection of the skin in which blotches resembling those of the nettle-sting appear upon the surface, accompanied by itching and burning sensations. Disturbance of digestion is the usual cause. For immediate relief, bathe the parts with a solution of soda or saleratus, a teaspoonful to the pint of hot water. Simple sponging

with hot water, or hot salt and water, a tablespoonful to the quart, is in some cases still more effective. The exciting cause must be removed to effect a permanent cure. A very excellent remedy is menthol, which should be rubbed upon the affected parts. When the eruption is general, a long neutral bath (92° to 94°) affords great relief. The addition of a pound of sal soda to the water increases the effect of the bath in allaying the itching.

Constipation.—Obstinate chronic inactivity of the bowels may be due to any one of several causes. One of the most common causes is a torpid state of the liver. In cases in which the stool is hard and dry, the immediate cause is deficiency of secretion on the part of the intestinal mucous membrane. The following suggestions will be found helpful: 1. Eat coarse food, such as cracked wheat, peas, beans, vegetables, etc. Avoid meat and condiments, tea, coffee, fats, pastry, and all unwholesome articles of food. 2. Drink two to four pints of water daily. The water should be taken an hour before the meal, and not within two hours after. 3. Wear at night a wet abdominal bandage, consisting of a towel wrung out of cold water dry enough so it will not drip, and covered with several thicknesses of dry flannel. The towel should be long enough to go around the body two or three times. It should be taken off in the morning, and the surface of the body rubbed for a while with the hand dipped in cold water. Two or three times a day knead and percuss the bowels with the hands for five or ten minutes very thoroughly.

Boils.—A boil originates in the death of a small portion of the deep tissues of the skin, which generally involves a sweat or a sebaceous gland. Inflammation is the natural process by which the dead tissue is separated from the living. The boil first appears as a red and somewhat painful nodule in the skin, about the size of a bean or pea. Very soon a white point forms at the apex; swelling spreads about the center, usually attaining about the size of a dollar. At the end of four or five days, the central portion, marked by a white point, becomes loosened, and a discharge occurs consisting of a plug, or core, together with the matter, blood, and fragments of dead tissue. The suppuration generally ceases in three or four days.

Treatment.— Boils may often be cut short if treated early by continuous applications of ice. The best plan that can be recommended for general employment is the early application of the fomentation, by which the pain may be relieved, and the natural process hastened. When there is general discomfort, warm full baths are very advantageous.

The boil may be aborted by injecting into the center with a hypodermic syringe one or two drams of a strong solution of carbolic acid in alcohol. One part carbolic acid to nine parts of alcohol is a good solution. A little cocain may be injected first to prevent pain. This should be done by a physician.

Corns. — Corns, or callouses, on the soles of the feet are often very painful, and occasion great inconvenience. If very tender and swollen, with redness of the tissues round about, the proper remedy is rest, lying in a horizontal position, accompanied by proper use

of poultices, until the soreness and irritation disappear. After the tenderness has subsided, a loose shoe should be worn; and to relieve the corn of pressure, apply over it a thick piece of buckskin or felt, with an opening in the middle the size of the callous. By this means, the pressure can be wholly taken off the callous, and nature will in due time effect a cure. If the skin is very thick, it may be softened by the application of compresses wet in soda-water and saccharated solutions. In a short time, the skin becomes softened, so it can be easily scraped off.

Freckles.—There are two kinds of freckles. Those which are produced by exposure to sun and wind are very superficial, and are easily removed by such substances as will remove the superficial cellular layers of the skin. Among the best remedies for this purpose are the following:

1. Three tablespoonfuls of fresh scraped horseradish; buttermilk, a pint. Allow to soak six or eight hours, shaking occasionally. Cider vinegar is sometimes used in place of the milk. Apply to the face at night, leaving on till morning.

2. Two tablespoonfuls of lemon juice; an equal quantity of water; a tablespoonful of glycerine; a heaping teaspoonful of powdered borax. Apply three or four times a day, drying after fifteen or twenty minutes with a fluffy towel.

Oily Skin.—In some persons there is an excessive production of sebaceous matter, or sebum, due to morbid activity of the fat glands of the skin. The skin of such persons presents a shiny look. Little beads of oily matter may be seen at the mouths of the glands

near the roots of the hairs. The forehead, nose, and cheeks are most frequently affected. When the scalp is affected, the condition may be indicated by soiling of the pillow. Acne is frequently accompanied by this condition.

Treatment.—The only treatment to be employed is the frequent application of soap. When many of the glands are clogged up, as indicated by the abundance of grubs, the surface should first be thoroughly rubbed with warm oil. Cocoanut or almond oil is the best. After half an hour, the surface should be rubbed with a flannel cloth, thoroughly saturated with soap moistened with warm water, and stretched over the fingers; or a soft sponge may be used. This is best done at night, just before retiring. When the secretion of fat is very profuse, the operation may be repeated two or three times a day.

Dandruff. — This is a condition in which branny scales are shed from the scalp in great abundance.

Treatment. — Restore the general health by proper attention to the digestion and general hygiene. For dandruff of the face, apply the same remedies recommended for the skin. The scalp should be treated in the same way, by gentle shampooing with ordinary washing soap, once or twice a week. A very soft brush should be used. Neither a stiff brush nor a fine comb should ever be used for removing dandruff.

An excellent remedy for dandruff is resorcin. It should be dissolved in alcohol, twenty grains of resorcin to the ounce of alcohol. This should be rubbed into the scalp freely once or twice a day.

Chilblains. — A gentleman called at our office the other day, suffering with what his physicians had

termed eczema of the feet. The heels and sides of the feet were red and slightly swollen and exceedingly painful. The trouble began with freezing the feet several years ago, as we found by inquiry. The case was evidently one of chronic erythema, an inflammation or congestion of the skin, or what might not improperly be termed, chronic chilblains. The following treatment cured him: 1. Bathing the feet with very hot water for fifteen or twenty minutes every night. 2. After bathing the feet with hot water, rubbing well with *benzoated zinc ointment.*

Foul and Profuse Perspiration.—Just before retiring at night, take a hot and cold foot bath, dipping the feet first in cold water, then in hot, allowing them to remain in each for about one-half minute, and repeating the operation fifteen or twenty times. Then wipe with a soft towel, and when nearly dry, rub with subnitrate of bismuth, using a large teaspoonful for each foot.

Piles.—Piles, or hemorrhoids, is a disease in which the veins of the rectum, through obstruction of the portal circulation, have become varicose. The tumors or hard bunches which protrude from the rectum are usually dilated or thickened veins, the distended walls of which frequently become so thin as to rupture, thus causing hemorrhage. This may vary in degree from a small streak of blood upon the passage to so great a quantity as to endanger the patient's life. A cure of this disorder consists in removing the cause, which may be a congested liver, producing habitual constipation of the bowels, and, in most cases, removal of the hemorrhoidal tumors by some one of the various approved methods is necessary.

When a movement of the bowels is accompanied by very great pain, the patient will experience great relief by sitting over a vessel filled with very hot water, the steam arising from it causing the irritated parts to become relaxed. Take a hot sitz bath, temperature 104° F. Take a hot enema when the bowels move, temperature 105° to 110°, and repeat the enema after the movement of the bowels. The sitz bath and the enema may be repeated two or three times a day. When there is much bleeding, the use of a decoction of hamamelis, or witch-hazel, made by adding one ounce of the fluid extract to a pint of water, is beneficial. One-fourth pint of this decoction should be used by enema after each movement of the bowels, and at night just before retiring. The local application of a cold compress is a useful measure not to be neglected. Of the various ointments recommended for use, an ointment composed of fl. ex. hamamelis one part and vaseline three parts, is one of the most useful. Subsulphate of iron is also a good astringent for use in these cases. It may be applied as an ointment, twelve grains to the ounce of vaseline. Use twice a day. In bad cases the patient must remain in a horizontal position until the hemorrhage is permanently controlled, or for at least half an hour after each movement of the bowels. Such cases require a surgical operation for a radical cure.

Red Nose.— This very annoying affection, which is usually, but not always, the result of the free use of alcoholic liquors, or indulgence in excesses of eating, may usually be relieved by very simple treatment if thoroughly carried out. The treatment consists in bathing the face and nose with water as hot as can be

borne for five minutes three times a day. Once in two or three days the nose should be painted with two or three coats of flexible collodion, which will at once, by contraction, compress the dilated blood-vessels, and remove the red color. The only objection to the use of collodion is that it gives the nose the appearance of having been varnished, but one who is really desirous of being relieved of this source of annoyance, will be willing to put up with this slight inconvenience for a few weeks.

Baldness.— If the scalp is smooth and shiny, no remedy will be of any service. If small, fine hairs are present, improvement may be secured by the employment of such means as will stimulate the hair follicles. The best of all stimulants is bathing of the head every day with cold water, accompanied by gentle friction, as rubbing with the ends of the fingers until the scalp is red, and gently brushing with a soft brush. The application of the actinic rays of the sun is found to be one of the most effective means of curing baldness. In a case recently treated at the Battle Creek Sanitarium, a man whose scalp was bald, in the course of a few weeks found himself raising a fine crop of new hair as a result of the application of this remedy.

Acne, or Pimples.— This disorder is indicative of a general lowering of the vital resistance. It is often associated with indigestion. The general health should be built up by means of cold water bathing. The affected parts should be bathed with very hot water for five minutes two or three times daily. A small sponge is a very convenient means of making the application. The sponge should be dipped in very hot water

and applied to the affected parts of the face, treating two or three pimples at a time successively, going over the whole surface. The disuse of animal fats is often necessary. The application of the actinic light rays by means of suitable apparatus is an excellent method of treating this difficulty. The skin is at first tanned, afterward develops a fine, healthy condition.

Sleeplessness. — This most annoying and exhausting symptom may be greatly relieved by attention to the following suggestions:

1. Retire early, having taken, an hour or so before, sufficient muscular exercise to induce slight weariness.

2. Eat nothing within four hours of bedtime. If "faint" at the stomach, drink half a glass of hot lemonade. If this does not suffice, a mellow, sweet, or subacid apple may be taken an hour before retiring, unless fruit occasions pain or acidity.

3. If feverish, the skin being hot and dry, take a light hand bath with tepid water upon retiring.

4. If troubled with cold feet and hands, employ the means suggested for the cure of cold feet.

5. Sleep in a cool room, but take care to see that the bedding is well aired and dry, and the room well ventilated.

6. When nervousness causes loss of sleep, there are various methods of inducing slumber, one of the most efficient being slow, deep, and steady breathing. By this means the lungs are filled with blood, and the brain is thus relieved of the congestion which causes wakefulness.

7. The neutral bath is the most effective means of promoting sleep. The temperature of the bath should

be 92° to 95°. The bath should be taken at bedtime. The patient lies in the bath until he becomes sleepy; then drying himself quickly and with as little exertion as possible, he goes directly to bed. In extreme cases the patient should be allowed to fall asleep in the bath. The wet-sheet pack may be used instead of the full bath when the latter is not available. The wet sheet should be wrung out of cold water as dry as possible. Care should be taken not to cover the patient too warmly. Covering should be just sufficient to make the patient comfortable, without inducing perspiration.

Heart-Burn.— A teaspoonful of wheat charcoal, taken immediately after a meal, is an excellent non-medicinal remedy for this uncomfortable derangement of digestion. Thorough mastication of the food is a measure of primary importance. Food should be chewed at least four or five times as long as usual. Tea, coffee, cold water, and other drinks should be avoided at mealtime.

Ivy Poisoning.—The susceptibility of poisoning by poison-oak seems to be due in a large degree to a sort of idiosyncrasy. Very few persons are likely to be poisoned unless they come in immediate contact with it. The result of poisoning with this plant is an inflammation of the skin, which in some cases is very violent. The best remedy in such an attack is application of cloths wet in cold water, or iced lime-water. Alternate hot and cold sponging of the part is frequently effective. The patient should drink a quantity of hot water, which is useful in producing perspiration, and this should be followed by a wet-sheet pack or vapor bath. Sponging of the parts alternately with

hot and cold water is of use in removing the swelling after the acuteness of the attack is passed.

Writer's Cramp. — *Symptoms:* Fatigue and a sense of insecurity in the arm and hand; patient grasps his pen too firmly; fingers seem clumsy; pen jerked up and down by twitching of the muscles of the hand and arm

Treatment.— In many cases, absolute rest of the affected muscles is necessary. This frequently necessitates a change of occupation. Every possible attention should be given to improvement of the general health. The application of galvanism to the affected muscles is an effective remedy in many cases. Hot sponging, alternate hot and cold applications, and massage are also of use. Some patients obtain the needed relief of the affected part by learning to write with the other hand; but, unfortunately, in many cases this also becomes affected. Some relief from the disagreeable jerking may be obtained by the use of quill or stub pens. Fastening a sponge to the penholder at the point at which it is held is sometimes beneficial. Some persons find relief to a considerable degree by grasping the pen between the first and second fingers, instead of between the thumb and forefinger.

The most recent, and apparently the most successful, method of treating writer's cramp is by means of massage. This is applied in various ways, according to the indications of each particular case.

Varicose Veins.—This is a condition in which the veins are greatly dilated, and become tortuous in their course. It is occasioned by occupations which require

long standing upon the feet, by constipation, and especially, in women, by pregnancy.

Treatment. — The inconveniences of this disease may be greatly lessened by the use of the elastic silk stocking or the elastic bandage. The bandage should be applied from the toes to above the affected part. It should be wound smoothly and with even pressure. Little pressure is required, as the natural swelling of the limb in standing will produce all the tension necessary, although a very slight pressure may be employed in the application of the bandage with the limb in a horizontal position. The patient should take care to keep the affected limb horizontal or slightly elevated as much as possible, so as to encourage the flow of the blood toward the heart. Sometimes the dilatation of the vein becomes so great that rupture occurs. In case of such an accident, the patient should at once elevate his limb as high as possible, and place a small roll of cloth, as a folded pocket handkerchief, over the point of the rupture, applying strong pressure over the compress. Recent improvements in surgery render it possible to effect a radical cure of this disease by antiseptic ligation.

Nosebleed. — Here are a few of the best remedies for this very common and sometimes dangerous affection:

1. Have the patient raise both arms above the head. This will cause contraction of the blood-vessels in the arms, and simultaneously in the mucous lining of the nasal cavity. In mild cases, this remedy will uniformly succeed with promptness. A dry handkerchief should be held to the nose in the meantime.

2. Administer a nasal douche with a hot solution of common salt. Dissolve a tablespoonful of salt in a quart of water at a temperature of 130°, and administer with a fountain syringe, inserting the nozzle of the syringe in the nostril which does not bleed, and allowing it to run out of the other.

Pinching the nose, seizing it as close to the cheek bones as possible, and pressing firmly for ten to fifteen minutes will often effect a cure.

Ear Discharge. — Cleanse the ear by means of a douche administered with a fountain syringe, allowing the fountain to hang only a few inches above the head. After the ear is thoroughly cleansed, carefully dry the canal by means of small bits of absorbent cotton wound about the end of a wooden toothpick. Then fill the canal quite full with powdered boracic acid. Repeat this every other day. A few weeks' treatment will usually effect a cure, even in the most obstinate cases.

Burning Feet.— Bathe the feet night and morning with tepid water, to which a little soap has been added. When nearly dry, dust freely over them a powder composed of one part of salicylic acid and sixteen parts of powdered alum. If the burning is especially troublesome at night, dip in hot water for fifteen minutes before applying the powder. A jug filled with cold water is a good palliative.

Sunstroke and Heat Exhaustion.—When a person is suffering with sunstroke, the face is red, the temples are throbbing, and the skin is hot. The proper treatment is to immediately put the patient in a cold bath if possible, or douse him with cold water. Pouring

cold water on the head and over the body is a means which should be employed, if a well is near. The body should be vigorously rubbed at the same time. No time should be lost in applying this important measure of treatment.

Heat exhaustion is a condition very different from sunstroke. The surface is likely to be cool instead of hot, and the patient requires hot applications instead of cold. He should be put into a hot bath, or have fomentations applied to the head and spine, while the body is sponged with hot water.

Bruises.—A bruise should be treated immediately by fomentations. Afterward apply the heating compress consisting of a towel wrung dry out of cold water, applied over the part and covered with several thick folds of flannel, so as to secure immediate warming. This compress should be left on for three or four hours. Then the fomentations should be applied. This treatment should be repeated several times daily. In this way the discoloration of the skin can be almost entirely prevented, and often wholly.

Burns and Scalds.— Protect the injured part from the air by covering with oil or vaseline, or equal parts of oil and lime-water. The most effective means of relieving the suffering from burns, is by immersion in water at a temperature about that of the body. At the Royal hospital in Vienna, patients are frequently kept in baths with the whole body immersed for several months. The new skin forms very readily under this treatment, and great comfort is afforded the patient. The bath temperature must be slightly below that of the body, and must be changed two or three

times a day. Cloths wrung out of cold water frequently changed or kept cool by sprinkling cold water upon the parts, or allowing the water to drip from a vessel suitably arranged, constitutes one of the most effective means of relieving the pain of a severe burn in which the skin has not been broken. When the skin is not broken, dry carbonate of soda may be spread over the parts and covered with a cloth, or the surface may be painted with a saturated solution of picric acid. The application should be repeated several times daily.

Sprains. — Give the parts rest at once, and apply very hot fomentations. If the part becomes swollen and hot, apply the fomentations every two hours, and wrap the affected joint and the adjacent portions of the limb with cloths wrung out of cold water. The cloths should be large enough to extend six or seven inches either side of the joint. The cloths should be renewed as soon as they become slightly warmed, or as often as every five or six minutes. For more effective cooling, a small stream of cold water may be allowed to trickle upon the parts, the water being caught in some suitable receptacle placed beneath the limb. After the first twenty-four hours, fomentations should be applied three times a day, and the heating compress should be applied during the intervals. This consists of a towel, or several thicknesses of cheese-cloth wrung dry out of cold water, wrapped about the affected parts, and thickly covered with flannel, so that reaction and warming will occur quickly. After the third day the joint should be carefully moved, and the muscles above and below the joint should be lubricated with vaseline

and rubbed in the direction of the heart. Very gentle rubbing may also be applied to the joint itself. Each day the amount and the vigor of the rubbing may be increased. Care should be taken to avoid procuring a lasting pain in the joint. The effect of the treatment should be to afford relief.

Muscular Strains. — If the muscles have been strained by too heavy lifting or too violent exercise, take a hot bath, or sponge the parts with hot water, and give the overworked parts entire rest until all soreness is gone. After the hot application a heating compress should be applied, to be well covered with mackintosh and dry flannel. This should remain in place until the next hot application. The heating compress consists of a towel or napkin wrung dry out of very cold water, covered with flannel or mackintosh, so as to secure the needed warming.

THE RUM FAMILY

NO greater calamity can befall a quiet, peaceful community than to have a bad family move into it. But no neighborhood ever suffered more from the bad influence of a family of wicked persons than from the effects invariably produced in any city or village by the advent of the rum family, with its numerous progeny of vices, irregularities, and crimes. We propose to devote this chapter to a consideration of the leading traits and characteristics of the rum family, and to make our readers sufficiently well acquainted with the various members of the family to convince them that they are all unsafe associates for young men, or indeed for any one who wishes to maintain his self-respect, and his standing as a useful member of society.

The original alcohol family contains half a dozen or more members, some of whom, although naturally inclined to evil, have become useful members of society; while others have been the means of a vast deal of harm. The four best known to the public have been supplied with names by the chemist, to distinguish them from one another, and are known as *methylic* alcohol, *ethylic* alcohol, *amylic* alcohol, and *butylic* alcohol.

The first of these, methylic alcohol, is commonly known as naphtha. Methylic alcohol, or wood naphtha,

is derived from the distillation of wood. It produces intoxication very quickly when drunk; but its effects are very transient, owing to its great volatility. It is not often used as an intoxicant, but has been so employed by persons of peculiar taste, or confirmed inebriates who were prevented from obtaining their customary allowance of grog. The author once had a patient who on several occasions swallowed half a pint of naphtha, when brandy or whisky could not be obtained.

Ethylic alcohol, or wine spirit, is the intoxicating element of spirituous liquors, and is obtained by the distillation of fermented liquids. The most common form in which it is used as a beverage is in brandy, whisky, beer, wine, etc. It is seldom found pure in commerce, being usually mixed with water. This variety of alcohol is more intoxicating in its effects and more injurious to the vital tissues than the preceding.

Butylic alcohol is generally obtained by the fermentation of the beet root. It is also, perhaps, produced in the fermentation which occurs in butter and cheese when they become old and rancid, since these substances contain an acid known as butyric acid, which is derived from this kind of alcohol. It is this which gives to frowy or rancid butter and very old cheese their peculiar flavor. This member of the family is still more active in intoxicating properties than those already mentioned, producing an intoxication which is very slowly recovered from, and in which there is very low prostration, trembling of the muscles, and severe coldness.

Amylic alcohol, or fusel-oil, is produced by the fermentation of potatoes, and also, to some extent, by the

fermentation of grains and fruits. It has a burning taste and pungent odor, and is the characteristic constituent of bad whisky. A few drops of fusel-oil will produce as profound an intoxication as a considerable quantity of ordinary alcohol, which accounts for the infuriating and deadly effects of bad whisky, as well as its rapidly fatal effects, as often seen among miners, negroes, and Indians. The deadly effects of cheap rum from the West Indies have become so manifest in some of the South Sea Islands, controlled by the English government, that it has become necessary to prohibit its introduction.

There are several other alcohols closely allied to those mentioned, and with similar properties, besides numerous other compounds which are classed by chemists in the "alcohol series," among which are the well-known substances, carbolic acid and creosote, the caustic and poisonous properties of which are too well known to require other than mere mention. If not own brothers, these compounds are at least cousins of "the demon of the cup."

Intoxication.— Each member of the alcohol family is capable of producing poisonous or intoxicating effects. In fact, they are all poisons, the effects of which have been termed *intoxication,* although the word "intoxication," when strictly used, means simply poisoning, and is properly applied to the condition of the system when laboring under the influence of any poison whatever. This use of the word is not very common in our language, although in the German language it is frequently so employed.

The Properties of Alcohol.— Perhaps the reader will be interested in the following remarks made by

the author in a lecture at a temperance convocation a few years ago:

Here is a test for alcohol: If you drop a little of this fluid into any substance containing alcohol, there will appear a very marked greenish color. Here is a glass vessel containing alcohol. I put a little of the test into it, and there is at once a perceptible change of color. Here is a vessel containing brandy. I need not tell you that it contains alcohol, for you see that the application of the test shows it at once. In the same way I will test the liquid contained in these other vessels, which are whisky, ale, gin, and hard cider. You see that the green color is very deep in each one. Here is some beer. I drop in a little of the test, and you see at once a green tinge spreading through the foam that rises up in the tube, and also gathering at the bottom. This is presumptive proof that there is alcohol in beer.

Poison in Bitters.—I have some other things here that I propose to test. There are a number of good people in the world who would not think of touching a drop of gin or whisky, but who do not have the slightest objection to taking a glass of bitters every morning. They will recommend you to take a little bitters for your stomach's sake. Here is a bottle of Hostetter's Stomach Bitters. I pour a little of it into this tube, and apply the test. You see how green it turns. It has almost as much alcohol in it as Scotch Whisky. Look at this sample of Jamaica Ginger. I put in only a few drops of the test, and it turns as green as the gin. It has just enough ginger in it to flavor the alcohol.

Here we have a bottle of "Temperance Bitters," or at least what is advertised as such. This is Dr. Walker's California Vinegar Bitters. The proprietor is taking an active part in the temperance work on the Pacific Coast. He is one of the most zealous advocates of temperance in the State, and publishes a temperance almanac to advertise his "bitters," which he declares contain no alcohol. Let me read you what is printed on the paper that goes around the bottle: "Dr. J. Walker's California Vegetable Vinegar Bitters, the Great Blood Purifier and Life-giving Principle. A remedy for dyspepsia, indigestion, consumption, sore eyes, stomach-ache, fits, palpitation of the heart, biliousness, etc., etc., tape, pin and other worms. No alcohol enters into the composition of the bitters. That curse is not offered for medicine. Nothing but invigorating and purifying herbs give them their wonderful powers to cure." In order to determine the amount of alcohol contained in a bottle of the bitters, I had half a bottle distilled by the chemist, and in this flask you see the product of the distillation. By means of the alcoholometer, it has been found to contain twenty per cent of alcohol. Now we apply the test. There is as beautiful a green as you could desire to see. I will guarantee this bottle of bitters to contain five per cent of alcohol.

Fire-Water.— Now let me call your attention to some of the physical properties of alcohol. It is combustible, as you all know. I will touch a match to some of this Jamaica Ginger. See how it flames up. It continues to burn as I pour it from one vessel to another. How evidently appropriate is the Indian's name for alcohol—"fire-water"!

In addition to this, alcohol is a *desiccant*, that is, it is drying in its character. I have been using some of it as a drier. I put this piece of steak into alcohol a few days ago, and I think it would now answer very well as a tap for a boot. After a few weeks, it will become so dry that I could rub it in pieces with my fingers.

An Alcohol Omelet.—This egg which I hold in my hand is the representative of an animal. The complete fowl is not here. If you place it under the proper conditions, that is, if you simply keep it warm,—you know we have artificial "mothers" nowadays,—it will develop into a full-fledged chicken. We can take the effect of alcohol upon this egg as a sample of what it will do to the human body. As I break the egg into a vessel containing whisky, you see that it turns white, and it will soon become as hard as though it were dropped into boiling water. If the vessel had contained pure alcohol, it would become so hard in a short time that I could turn the vessel upside down without spilling out the egg. Alcohol has the same drying and hardening effect upon the human body. The liver, the heart, and in fact the whole body, is made up principally of albumen and fibrin, the substances which compose the egg.

A Human Pickle.—Besides its drying properties, alcohol is also an antiseptic; that is, it possesses the property of preventing decay in perishable substances. Some one may say that if alcohol prevents decay, it ought to be valuable in preventing the decay and death of the human body. In fact, a young man once told me that his grandfather had taken, during his life, a

hogshead of Jamaica rum, and he was sure that it had been the means of preserving him to a good old age.

During the Centennial year, while I was in Wilmington, Delaware, I heard of a man who was one hundred and seventeen years old on the fourth of July. I was paying a good deal of attention to the subject of hygiene just at that time, and I thought perhaps he had lived so long because he was temperate in his habits. Upon inquiry, however, I found that he was an inveterate smoker, and that for a hundred years he had taken his toddy regularly. This was quite a disappointment, but I resolved to see him, nevertheless. When I found him, I thought that whisky had not done so much for him after all. He hardly looked like a human being, he was so dried and shriveled up. He looked like some of those strange creatures that Stanley saw in Africa. After seeing him, I came to the conclusion that he was a human pickle. He had been pickled by the use of alcohol, and had in reality been dead for the last thirty or forty years, though his friends had neglected to bury him.

It is through its antiseptic properties that alcohol interferes with the process of digestion. The process of digestion is in some respects similar to that of fermentation. If you keep meat in alcohol, it will never decay. If, therefore, you take alcohol into the stomach after each meal, you will interfere with the process of digestion which is going on there, and will in time seriously impair the digestive functions of the stomach. Alcohol also destroys the pepsin of the gastric juice.

The Whisky Breath.— In the next place, alcohol is volatile. Many who use whisky wish it were not;

for it is this property which enables any one to detect a man who has been drinking, by the odor of his breath. This is the reason why some people carry cloves and things of that sort in their pockets to chew on frequent occasions.

Alcohol an Irritant.—That alcohol is an irritant, may be readily shown by placing a drop of it in the eye. I recently had a patient who was suffering with a disease of the eye, for which I prescribed a solution of atropia to be placed in the eye. The druggist used a solution of atropia in alcohol for making the lotion, and the effect on the eye of the patient was so irritating that she came very near losing it, although the solution contained not more than ten drops of alcohol to the ounce. If, then, it is irritating on the outside, how much more dangerous must be its effect on the inside, when it comes in contact with those delicate little cells which do our thinking and feeling for us, and perform all the work of the body.

How Alcohol Stimulates.—Alcohol is often called a stimulant, and so it is, if we use the word in its proper sense. A stimulant is well defined by an English physician as "something that gets strength out of a man instead of putting it into him." There is a general idea that drinking whisky makes a man stronger; but this is a mistake. A whip is a stimulant to a tired horse; it makes him go faster, but it does not make him any stronger. This is precisely the effect that alcohol has upon the human body. Experiments show that a man is actually weaker, that he cannot lift so much after he has taken a drink of liquor as he could before. A man who has just had a glass of

whisky feels as though he could run faster, lift more, or make a better speech, than he ever did before in his life; but the fact is that both his muscular and mental powers have been impaired. The feeling of strength is apparent, not real.

Let us now notice a few of the arguments against the use of alcohol, which scientific research has developed:

1. Alcohol a Poison of Plants.—Vital properties are pretty much the same in a general way, whether manifested by a mushroom or a man; and any substance which will destroy the life of a plant is not likely to be wholesome to human beings. If a plant be watered with a solution of alcohol, its leaves soon wither, turn yellow, and the plant dies, even when the proportion of alcohol is as small as one part in one thousand parts of water.

2. Alcohol a Poison to Animals.—A tadpole, when dropped into a vessel containing alcohol, dies in a minute. Leeches and other small animals succumb in like manner.

A New York journal recently reported a series of experiments by a French physician on the influence of alcoholic liquors on fowls, as follows:

"He administered to them brandy and absinthe, and found one and all to take so kindly to their unwonted stimulants that he was forced to limit each bird to a daily allowance of six cubic centimeters of spirits, or twelve of wine. There was an extraordinary development of cocks' crests, and a rapid and general loss of flesh. The experiments were continued until it appeared that two months' absinthe-drinking suf-

ficed to kill the strongest cock or hen; while the brandy-drinkers lived four months and a half, and the wine-bibbers held on for ten months before they died the drunkard's death."

Drunken Goats.— Some Pennsylvania beer-sellers tried the effects of beer upon a goat. Whether the experiment was for the purpose of determining the quality of the beer or the constitutional toughness of the goat, is not recorded; but the result was fatal to the goat, notwithstanding the hardihood for which he is proverbial. Just how many glasses were required to extinguish him is not mentioned; but he died, and the high quality of the beer was established beyond the possibility of cavil.

But this is not the end of the story. The Humane Society heard of the proceeding, and immediately began an action against the beer-venders for cruelty to animals. The action was undoubtedly justifiable; but it is a matter of wonderment that the same lawmakers who have made it an offense to kill goats with beer, have never once thought of its being a crime to kill human beings by the same means, although there are millions of human beings sacrificed in this way, to one goat. It is to be hoped that the question of prohibition will be agitated until human beings are at least as well protected as goats.

Swine Topers.— The eminent Dr. Dujardin-Beaumetz, of Paris, has been engaged for some years in conducting experiments to ascertain the effect of alcohol upon various animals, chiefly pigs, and finds it to be uniformly that of a poison. A brilliant writer wittily says, "If lower animals were addicted to the drug

to one-tenth the degree man is, in a short time there would not remain upon the face of the earth an animal which would be tamable, workable, or eatable."

3. Alcohol a Poison to Human Beings.—Notwithstanding the apparent impunity with which diluted alcohol in the form of various liquors may be taken, pure alcohol is rapidly and certainly fatal when taken into the stomach without dilution. Cases of instant death from drinking a considerable quantity of strong liquor have often been recorded; and numerous instances of death from this cause are constantly occurring in every large city. As we shall show hereafter, alcohol in every form is still a poison, the rapidity of its effects being largely determined by the degree of dilution in which it is introduced into the system.

4. Alcohol an Irritant.—The irritating effects of alcohol are readily observed by placing a drop upon a raw surface. Even a very dilute solution will produce intense suffering. Still more profound, though for a time less irritating, effects are produced when the alcohol is absorbed into the system, and comes in immediate contact with the delicate internal structures of the body.

5. Alcohol a Narcotic.—Its first effects are exciting; but like most substances of similar nature, its secondary and more prominent effect is that of a narcotic. It benumbs the sensibilities. If a man is exhausted, it relieves the sense of fatigue by obtunding his senses, not by replenishing his wasted energy. Persons who have died from an overdose of alcohol, present all the indications of narcotic poisoning.

6. Alcohol an Anesthetic. — A tablespoonful of strong alcohol, held in the mouth for two or three minutes, will obtund the sense of taste so as to render a person unable to distinguish sweet from sour, saline from bitter. If taken in a sufficient quantity, it will relieve the sense of pain sufficiently to enable a surgeon to perform an operation with little or no suffering on the part of the patient. A few years ago we employed it successfully as an anesthetic to enable us to perform an operation upon the eyes. The patient, a lady, asserted that she felt scarcely any pain, although the operation involved the most sensitive portions of the eye, and required fully half an hour for its performance, as both eyes were operated upon.

7. Alcohol Not a Food. — The aristocratic toper, who wishes to give an air of respectability to his vice, will claim that alcohol is a food. He will cite, in proof, instances in which persons have lived for weeks by the aid of no other nutriment, taking nothing but alcohol and water. This semblance of argument scarcely needs exposure; for the most it can be claimed to prove is the fact that persons have lived several weeks while taking only alcohol and water. The fact that individuals have in several instances been known to live from thirty to sixty days while taking only water, shows conclusively that those who survived a shorter time on brandy and water, lived in spite of the alcohol instead of by its aid.

8. Alcohol Makes Bad Blood. — Those who have maintained that alcohol is a food, have made many experiments for the purpose of establishing their theory upon scientific grounds. By these experiments,

it has been found that the urine and other excretions contain less of the worn-out material of the tissues when a person is using alcohol than when he is abstaining. From this alone it is concluded that alcohol prevents the wearing out, or disintegration, of tissue,—a most astonishing conclusion. Nō one but a man stoutly prejudiced in favor of alcohol would think of forming such a conclusion. A far more rational deduction from the premises would be that the presence of alcohol in the system prevents the excretory organs from eliminating from the body the dead and poisonous products which result from the wearing out of the tissues.

It is on account of this impure state of the system that the flesh of spirit drinkers is notoriously so difficult to heal in cases of wounds or surgical operations.

9. Alcohol Destroys the Blood.—When this fiery drug is taken into the stomach, it is soon absorbed into the circulation, where it comes in contact with the corpuscles of the blood. The effect upon these delicate and important structures we can study by applying alcohol to the blood outside of the body; for the corpuscles will retain their life and activity for a time after being removed from the body, if placed under proper conditions. To make sure of no mistake about this matter, we will perform the experiment while we write. Our microscope, which will magnify one million times, being in readiness, we thrust a needle into the finger, and thus obtain a tiny drop of blood. Placing it upon a glass slide, we adjust it upon the instrument, and look at it. Although the film of blood in view is so thin as to be transparent, it is crowded with beautiful bi-

concave discs, the red blood corpuscles, each of which is perfectly formed, though only one thirty-five hundredth of an inch in diameter. Now we apply a drop of alcohol, a very tiny drop. Mark the effect. No sooner does it touch these little bodies, than they begin to shrink, and soon lose all resemblance to their natural appearance. In a short time they can be seen breaking up into fragments; and in five minutes from the commencement of the experiment, the once beautiful and symmetrical bodies which compose one-half of the blood, are reduced to broken fragments and shapeless masses. They have been fairly cut in pieces and eaten up by the alcohol.

Rum Choking.—"But what harm does this do?" says the toper or the moderate drinker. "The loss of a few blood corpuscles cannot be of any great consequence." The ultimate effects are the same as though the supply of air were cut off from the lungs by a cord tightly drawn around the neck. The business of the red corpuscles is to carry oxygen from the lungs to the tissues. If they are destroyed, oxygen cannot be carried in sufficient amount, and the blood becomes foul, being charged with large quantities of carbonic acid, a poisonous substance which ought to be replaced by oxygen. One of the quickest ways of destroying life now known, is to cause an animal to inhale a poisonous gas known as carbonous oxide, which has the effect to paralyze all the blood corpuscles. Alcohol does the same thing just in proportion to the quantity taken.

10. Alcoholic Degeneration. — In addition to its effects upon the corpuscles, alcohol produces other

serious changes. One of the most important of these is coagulation, or thickening of the fibrin of the blood, occasioning the formation of little clots, which are swept along in the blood current until they reach the finest capillaries, where they are lodged, thus obstructing the circulation, and, according to the eminent Professor Carpenter, of England, constituting the first beginning of organic disease of the nerve centers and other important organs. These minute clots are often the cause of boils and other troublesome abscesses; and when they become enlarged, as they sometimes do, they may produce instant death by the plugging up of a large artery in the brain,— an accident which there is every reason to believe is not uncommon in cases in which large quantities of alcoholic spirits are taken.

Alcohol also greatly increases the amount of fat in the blood, probably by preventing the changes necessary to complete digestion or assimilation of the fat. In consequence of this surplus of free fat in the blood, fatty degeneration of the heart, blood-vessels, liver, kidneys, and in fact of every part of the body, is induced, the fat particles being deposited in these various organs in place of their proper tissue.

It may further be objected that these changes do not occur unless very large quantities of alcohol are used. This, again, is an error. Dr. Carpenter is authority for the assertion that the changes in the corpuscles and the fibrin of the blood take place when not more than one part of alcohol to five hundred of blood is employed. Thus it will be seen that the very weakest wines are unsafe, since none of them contain

less than three to five per cent. Even small beer would be capable of doing mischief in this way.

11. A Drunkard's Heart.—When alcohol is taken into the blood, it soon comes in contact with the nerve centers which govern the action of the heart. Its effects are the same as upon the other nerve centers. It paralyzes them, just as chloroform does the brain. Then the heart is like a steam-engine without a governor, or a clock from which the pendulum weight has been removed. It runs down with wonderful rapidity. This effect is largely due, also, to the influence of alcohol upon the small blood-vessels; the nerves which control them becoming paralyzed, they become dilated or relaxed, and so afford less resistance to the action of the heart, allowing it to beat too rapidly. This increased action is most unfortunately mistaken for increase in strength on the part of the organ, when it is mere increase of action—wasted force. The amount of extra work done by the heart under the influence of liquor may be readily estimated. Dr. Parkes, by a series of careful experiments, found that the pulse of a man whose heart beat about seventy-four times a minute, or 106,560 times in twenty-four hours, when drinking only water, was, when under the influence of one ounce of alcohol per day, compelled to beat 430 times more in a day. Two ounces of alcohol per day caused an increase of 1,872 beats a day. Four ounces required 12,960 extra beats a day. Six ounces drove the pulse up to 18,432 extra beats; and eight ounces, to 25,488 unnecessary beats, or nearly one quarter more than when taking only water.

A Toper's Pulse.—The pulse of a toper is characteristic. It is weak, frequent, easily quickened. even

by very slight exercise, and very irregular. Alcohol has a directly depressing influence upon the heart, diminishing its power for work, and rendering it subject to both functional and organic disease.

12. The Whisky Flush.—The local blood supply of the body is regulated by means of special nerves, which follow the blood-vessels from the heart to their minutest distribution. One of the effects of alcohol is to paralyze the centers in which these nerves originate, which renders the vessels unnaturally dilated, allowing too much blood to enter various parts, thus occasioning congestion and even inflammation. In this way the lungs, liver, heart, or any other portion of the body, may become diseased. It is this which causes the drunkard's face to flush; and not only the face, but the whole body—the brain, the liver, every vital organ—is in the same state of congestion. Is it any wonder that the toper feels depressed and enervated, and in need of a "pick me up" the next morning after a debauch? or that he falls so easy a victim to causes of disease which others escape? It was long ago observed that drunkards are the favorite victims of cholera, the plague, sun-stroke, and other causes of speedy death. The system is prepared, by the paralyzing influence of the drug, for almost any form of disease to which human flesh is heir.

13. A Toddy Blossom.— One of the signs of intemperance, which its victims put forth the most strenuous efforts to suppress, is that peculiar enlargement of the nose, with intense redness, so appropriately termed the "rum blossom." The effect of alcohol is to paralyze the nerves of the blood-vessels; and when

its frequent use occasions the almost constant paralysis and engorgement of the blood-vessels of the face and nose, more particularly the latter, it grows too fast, and by this means may acquire enormous size.

14. The Drunkard's Brain. — The brain, when it is healthy, is so soft that it would scarcely retain its shape if it were not for the skull. The sharpest knife is required to cut it without mangling its structure. It is necessary to immerse the organ in alcohol for weeks, in order to harden it, when a microscopic examination is necessary. But a drunkard's brain is already hardened. A celebrated anatomist declared that he could tell a drunkard's brain in the dark, by the sense of touch alone.

It must not be supposed that every drunkard's brain is as hard as a pickled one; but it may be fairly supposed that the hardening effect of alcohol has no little influence in the production of degenerations of the brain, such as result in various forms of progressive paralysis. Numerous functional disorders of this organ are also traceable directly to the habitual use of alcoholic liquors. Locomotor ataxia, an almost hopeless malady, involving the brain and spinal cord, is very often the result of intemperance.

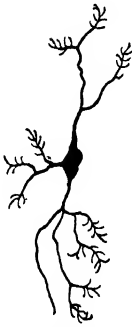
Recent experiments have shown that even moderate doses of alcohol produce changes in the nerve cells of the frame. The delicate filaments by which cells connect with one another become shrunken, thus making it impossible for them to make the proper contact. They become changed in form so that they make wrong contacts, just as sometimes happens in a telephone or electric-lighting system when the wires are broken, thus

shutting off lights and breaking communication and forming connections which may be dangerous and in the highest degree undesirable. The accompanying illustration shows the appearance of some of these nerve cells damaged by alcohol. The experimenter found that this effect is produced immediately, and lasts for some days, so that when a person is under the influence of alcohol, even though he may not have taken a very large dose, his nerve cells are in a damaged and injured state. When this injury is frequently repeated, the damage becomes permanent. It is in this way that paralysis, insanity, and various other nervous disorders which are characteristic of the effects of alcohol are produced.

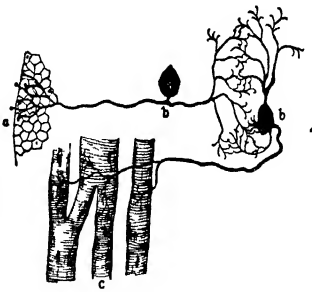
15. Alcoholic Apoplexy.—The intense congestion of the brain induced by alcohol is the very condition in which apoplexy, or rupture of a blood-vessel, is most likely to occur. When the walls of the arteries have been weakened by fatty degeneration, the danger is increased many fold.

It has been claimed that old persons require alcohol on account of the diminished activity of their vital functions. The fact above stated shows clearly that in old age the danger from the use of alcoholic liquors is greatly increased.

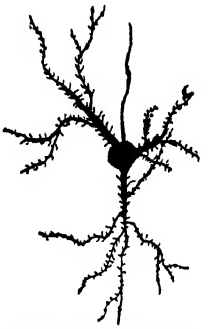
16. Alcoholized Nerves.—Who has not observed the trembling, unsteady hand of the man who has long been accustomed to the use of alcoholic liquors? Often his shaking hand deposits a share of the poisonous dram upon the ground. If he is a mechanic, he cannot resume his work without a strong toddy "to steady his hand;" if an accountant, he must have a glass to



A NEURON,
OR NERVE - CELL

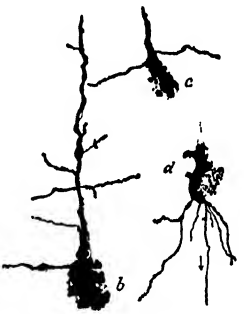


(a) SKIN
(b b) NERVE - CELLS
(c) MUSCLE



NORMAL NERVE-CELL SHOWING POINTS OF CONTACT

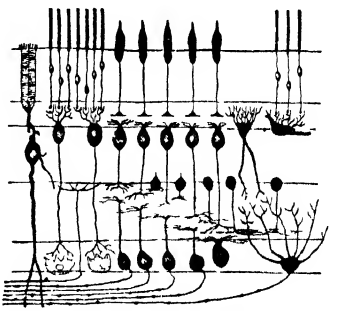
NERVE CELL IN ACUTE
ALCOHOLISM



APPAEARANCE OF NERVE CELL
IN CHRONIC ALCOHOLISM

CONTRACTED
NERVE-CELLS
CONTACT BROKEN

A PURKINJE 5 CELL



NERVE CELLS OF THE RETINA

"clear his head." This condition, at first temporary, finally becomes permanent, and thus hopeless disease may originate.

17. The Drunkard's Stomach.—We have endeavored to illustrate by colored plates the contrast between a healthy stomach and a stomach affected by alcoholic disease.

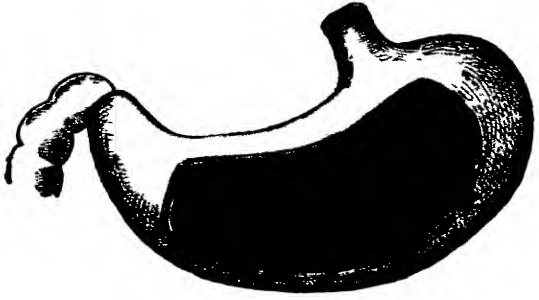
We would direct special attention to the uniform rosy tint characteristic of the healthy state of this organ, in which digestion, one of the most important of the vital processes, is performed. The stomach is a hollow organ, and physiologists have succeeded in making a permanent opening into its interior in some of the lower animals, through which they could watch the organ at work, and study the effects of the various substances which were introduced through the mouth, or through the artificial opening. Accident has, in several cases, made the same observation possible in human beings. One of the most notable cases was that of Alexis St. Martin, an employee of the Hudson Bay Fur Company, who, in the early part of last century, received a gun-shot wound, which carried away a considerable portion of the abdominal wall, and perforated the stomach. The wound healed in such a way as to leave a permanent opening into the stomach, through which the process of digestion, and the effects of various substances upon the stomach and digestion, could be accurately observed for many years. Dr. Beaumont made a careful study of the effects of alcohol upon the stomach of this man.

18. The Stomach of a Moderate Drinker. — The illustration also represents the condition of the stomach

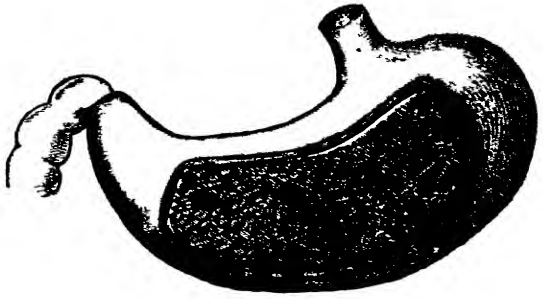
of a person accustomed to use alcoholic drinks in what is known as "moderation;" as, for example, a man who takes his glass of grog before breakfast or at dinner, or a bowl of sling as a "night-cap." The mucous membrane of the stomach is in a state of congestion. This congested condition was observed by Dr. Beaumont in the stomach of Alexis St. Martin whenever he was allowed to take alcoholic drinks, of which he was very fond, even in moderate quantity. The effect of alcohol, as well as that of mustard, pepper, pepper-sauce, spices, and condiments, is to produce a state of excitement and irritation in the stomach, the result of which, when frequently repeated, is permanent congestion, and is the cause of numerous forms of dyspepsia. But alcohol does more than simply irritate the stomach. By its antiseptic influence, it prevents the digestion of the food; and by its chemical properties, it destroys the action of the gastric juice, and so does triple mischief.

19. The Stomach of a Hard Drinker.— A representation of the actual state of things which has been found existing in the stomachs of persons accustomed to use alcoholic liquors daily in large quantities is shown in the accompanying cut. The blood-vessels are dilated, as in the case of the moderate drinker; and in addition, small ulcers are scattered over the diseased surface. The stomach of an old toper might be in the condition shown in this plate without his being conscious of the fact, as the nerves of the stomach are so paralyzed by alcohol that their normal sensibility is quite lost.

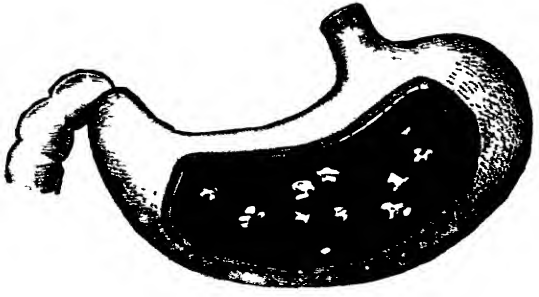
20. The Stomach in Delirium Tremens.—The cut also represents in a very faint degree the terrible con-



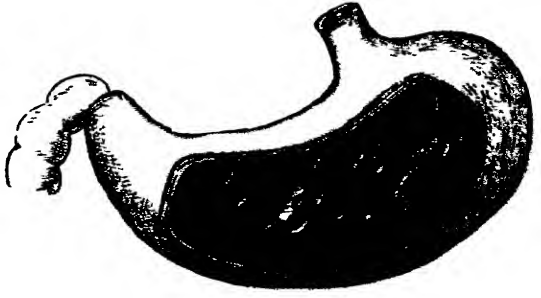
A HEALTHY STOMACH



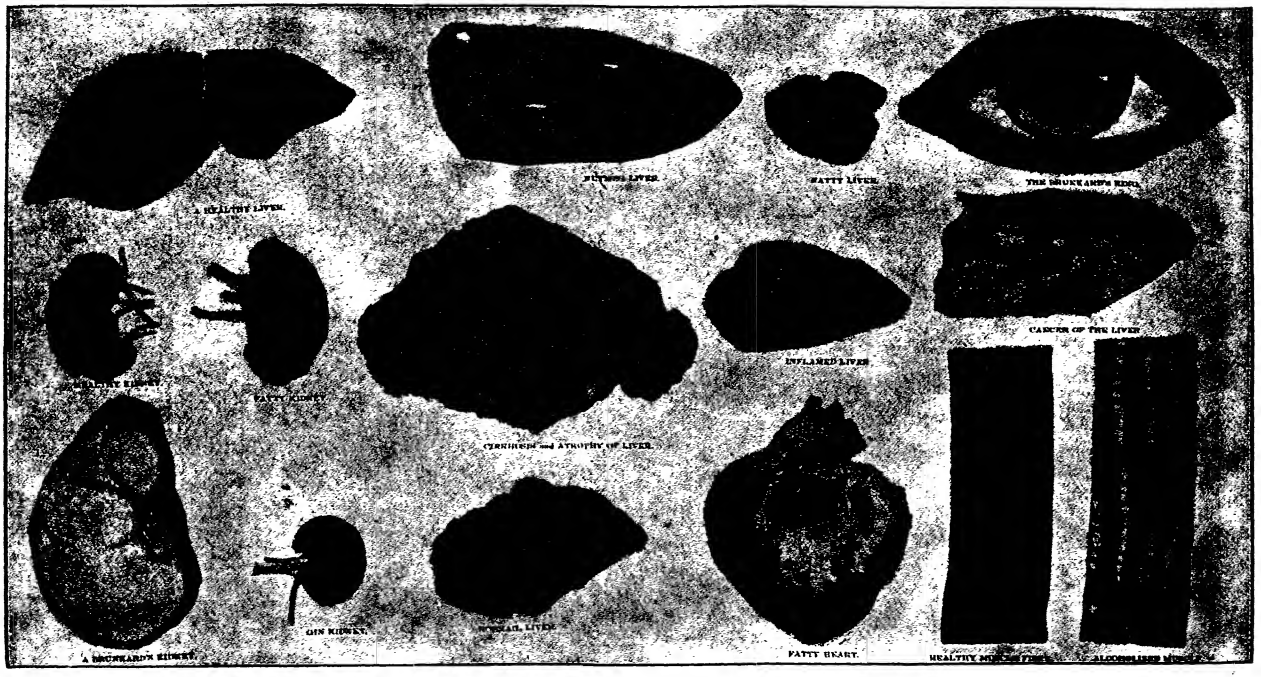
THE STOMACH OF A MODERATE DRINKER.



THE ULCERATED STOMACH OF AN HABITUAL DRUNKARD



THE STOMACH IN DELIRIUM TREMENS.



EFFECTS OF ALCOHOL UPON THE VITAL ORGANS.

dition present in the stomach of a victim of alcoholic poisoning, suffering with what is generally known as "delirium tremens," or acute alcoholism. The mucous lining of the stomach is in a state of intense inflammation, so that its functions are wholly suspended. In a case which we had under treatment a few years ago, we found the patient at our first visit suffering most intense nausea. He had been vomiting incessantly for two or three days. The smallest sip of water could not be retained upon the stomach. Great quantities of mucus were vomited, together with blood. During such an attack, the patient generally feels little pain, and often refers his symptoms to his stomach, since his sensibilities are so benumbed that he is unconscious of his real condition. Dr. Beaumont observed, on one occasion when Alexis St. Martin had been drinking heavily for a few days, that although his stomach was in a state of inflammation and ulceration, he was insensible of pain, and felt no inconvenience, only suffering from a severe headache. *Post-mortem* examination of persons who have died of delirium tremens usually discloses the stomach black with mortification.

21. Alcoholic Insanity.—The condition of a man under the influence of liquor is precisely the same as that of an insane man as regards his mind. When the act of getting drunk is frequently repeated, the condition of the mind induced by drink may become permanent, when the individual is a fit subject for an insane asylum.

22. A Drunkard's Liver.—The appearance of a drunkard's liver is characteristic. "Hob-nailed liver" is another name for the diseased organ as found in

spirit drinkers. It is shrunken, hard, and almost totally useless, insensible alike to pain and proper sensibility. Externally, it looks like the hob-nailed sole of an English cartman's shoe, from which resemblance it received its name.

23. Beer and Bright's Disease.— The idea that beer is harmless because it contains but a small proportion of alcohol, has been wholly refuted by the observation that Bright's disease and other maladies of the kidneys are far more frequent among beer-drinkers than among any other class of men.

24. Drunkard's Dropsy.—The bloated features of the sot indicate too plainly for mistake the dropsical tendency of the alcohol habit; and the ultimate effects of the poison upon the liver and kidneys, as already described, lay the foundation for one of the most incurable of all the forms of dropsy. We have seen many cases of dropsy induced in this way, and recovery, even under the most favorable circumstances, has been very rare indeed.

25. Alcoholic Consumption.—Dr. Richardson points out the fact that alcohol, instead of preventing, actually produces consumption, and that of the most fatal type. He states that a person suffering from alcoholic phthisis shows no improvement under treatment. The disease steadily, surely, and usually quite rapidly, progresses to a fatal termination.

26. Alcohol vs. Strength.—The laborer, the traveler, and the soldier use alcohol under the delusion that it strengthens. When fatigued, the laborer takes a glass of grog, and feels better, or thinks he does. He imagines himself stronger. His increased strength,

however, is wholly a matter of imagination. Experiments show that a man can lift less when under the influence of alcohol than without it.

27. Alcoholized Muscles.—Among the other degenerations produced by alcohol, fatty degenerations of the muscles should be mentioned. This degeneration consists in a change of the proper muscular tissue to fat. The process may involve all the muscles of the body, or simply a few, as those of the heart and blood-vessels. It is an injury which can in no way be repaired, and must inevitably end in death, sooner or later.

28. Alcohol vs. Animal Heat.— The sensation of warmth produced by taking a glass of wine or brandy is delusive. The circulation is unbalanced, and for a few moments there is a seeming increase of heat; but the thermometer shows that there is a decrease in the temperature. Says Dr. Parkes, the eminent English sanitarian, "All observers condemn the use of spirits, even of wine or beer, as a preventive against cold." The names of Dr. King, Dr. Kane, Captain Kennedy, and Dr. Hayes may be cited as holding this opinion. In the last expedition in search of Sir John Franklin, the whole crew were teetotalers.

29. Alcohol a General Disturber in the Vital Economy.— Close upon the derangement of the stomach, which is certain to come sooner or later with all drinkers, follows nearly every other functional disease possible to the human system. Every organ is disturbed. The whole vital machinery is deranged. Strange noises are heard in the head, occasioned by the rushing of hot torrents of poisoned blood through the dis-

tended blood-vessels of the head, which pass near the ear. Black spots and cobweb appearances annoy the sight. Alcoholic amaurosis, or amblyopia, comes on, and the sight becomes impaired; sometimes blindness follows. The dilated blood-vessels of the skin become permanently enlarged, especially in the face and nose, and the drinker has a rum blossom. Skin diseases of various sorts are likely to appear, particularly eczema of the fingers or toes, or on the shins. An unquenchable thirst seems to be ever consuming the blood, and nothing but alcohol will even temporarily assuage the desire for drink. Notwithstanding, large quantities of fluid will be taken, often amounting to several quarts a day, which overwork the excretory organs.

The liver and kidneys are disturbed in their functions, one day being almost totally inactive on account of the congestion, and the next rallying to their work, and doing double duty.

Every organ feels the effect of abuse through indulgence in alcohol, and no function is left undisturbed. By degrees, disordered function, through long continued disturbance, induces tissue change. The imperfectly repaired organs suffer more and more in structure, until the most extensive and disastrous changes have taken place.

30. Alcohol vs. Longevity.— It is not very easy to prove that the influence of alcohol, as of every other poison, is to shorten life. Dr. Willard Parker, of New York, shows from statistics that for every ten temperate persons who die between the ages of twenty-one and thirty, fifty-one intemperate persons die. Thus it appears that the mortality of liquor-users is *five hun-*

dred per cent greater than that of temperate persons. These statements are based on tables used by life insurance companies.

31. The Entailments of Alcohol.—The drinker himself is not the only sufferer from his vice. Indeed, it seems in many cases that he is not the greatest sufferer. He may even live out his threescore years and ten, in apparent defiance of the laws of nature and the warnings of friends; but look at his children. Are they as strong and robust as he?—Oh, no; instead, we often see them frail, nervous, imbecile, idiotic,— poor specimens of the race. "The iniquities of the father are visited upon the children."

Dr. S. G. Howe attributed one-half the cases of idiocy in the State of Massachusetts to intemperance, and he is sustained in his opinion by the most reliable authorities. Dr. Howe states that there were seven idiots in one family where both parents were drunkards. One-half of the idiots in England are of drunken parentage, and the same is true of Sweden, and probably of most European countries. It is said that in St. Petersburg, most of the idiots come from drunken parents.

A Relic of Barbarism

THE origin of a custom which has enslaved many millions of human beings in its toils, which has within a few centuries fixed itself so firmly upon the race, and become so widespread as to be practically universal among mankind, whether civilized or savage, cannot be without interest to those who are users of the weed, as well as to those who wage war against this evil practice. The latter, especially, will find in the ignoble origin of tobacco-using an argument of no little force against this vile habit; and it is for this purpose particularly that we write.

Tobácco-Using Discovered. — In the month of November, 1492, when Columbus discovered the island of Cuba, he sent two sailors to explore it, who reported, when they returned, among many other strange and curious discoveries, that the natives carried with them lighted fire-brands, and puffed smoke from their mouths and noses, which they supposed to be the way the savages had of perfuming themselves. They afterward declared that they "saw the naked savages twist large leaves together, and smoke like devils."

To civilized human beings, this was the first sight of the vile habit which has become so common that every city, town, and village is actually perfumed, or more properly fouled, with the vile stench of the poisonous weed. The impression made upon the unso-

phisticated Europeans was evidently not greatly in favor of the custom, since they compared the smoking Indians to devils.

Originating with the wild barbarians of America, the smoking habit was, after some years, introduced into Europe; and receiving the sanction of the physicians who, just at that time, chiefly occupied themselves in searching for some new nauseous compound with which to experiment upon the lives of their patients, it was rapidly adopted, not only by the lower classes, but by those in high authority, even princes and nobles participating in the new intoxication.

Origin of Snuff-Taking.— It appears that the taking of tobacco in the form of snuff was also discovered among the savage natives of this continent upon the second visit of Columbus to America in 1494. A Roman friar, named Pane, who accompanied the expedition, thus describes the custom as it then existed among the Indians: "After reducing the leaves to a fine powder, they take it through a cane half a cubit long; one end of this they place in the nose, and the other upon the powder, and so draw it up, which purges them much."

The purging referred to evidently describes the violent sneezing which resulted from the inhalation of the powdered poison. If the sailors thought that the smoking savages appeared "like devils," they certainly must have been ready to compare a party of sneezing Indians to a group of lunatics. However, it must be confessed that the charge of lunacy could not be applied to the ignorant, barbarian snuff-takers with one-half so much propriety as to their civilized and enlightened, but certainly not wise, imitators. How so filthy, un-

natural, and eminently disgusting a habit could ever have been cultivated by rational beings, is a most profound mystery.

Origin of Tobacco-Chewing.— In 1503, when the Spaniards landed in Paraguay, the natives attempted to repulse them, and came out against them in large numbers, beating drums, throwing water, and "chewing herbs and spurting the juice toward them." The herb employed was tobacco, and the object of its use in the peculiar manner indicated was to get the poisonous juice into the eyes of the intruders, and thus disable them by depriving them of sight. From this it would seem that tobacco-chewing was first practiced as a means of defense, for which purpose the expectorated juice was undoubtedly quite effective. We have seen modern tobacco-chewers whose copious expectoration made it next to impossible for any one to approach within several feet without being soiled with the vile juice. In the days when war was carried on by hand-to-hand combat, we can very readily understand that a wild Indian filling the air all about him with poisonous, irritating, filthy tobacco juice, would be a very formidable object.

The Inventors of Pipes and Cigars. — The first smokers employed what was practically identical with the modern cigar. Dry tobacco leaves were made into rolls, and wrapped with the leaves of Indian corn, one end being lighted, and the other placed in the mouth. Pipes were also employed, those used in North America being shaped almost exactly like the letter Y, except that the stem was longer and the forked end was symmetrical. In use, the forked end was placed in the

nostrils, and the other end in the dense smoke arising from tobacco leaves placed on glowing coals. In Mexico and South America, pipes almost exactly like those now in use, with numerous other forms, were employed in the same way in which pipes are now used.

Thus it appears that tobacco-using, together with the implements of its use and all the different modes of taking it, originated wholly with the heathen barbarians who roamed like wild beasts over the plains and through the dense forests of this continent four centuries ago. Civilized men have made no improvements or discoveries of any account in connection with its use; they have simply followed the example of those naked savages whom the discoverers of America saw chewing, snuffing, and smoking "like devils" over four hundred years ago. It is evident, then, that tobacco-using is a barbarous custom in the fullest sense. As to how savages learned the use of the weed, history does not give us any hint; but the fact that pipes and snuff-taking tubes are found in their most ancient burial mounds, which are often surmounted by huge trees that must have required many centuries for their growth, is evidence of its great antiquity; and in this habit we may unquestionably find one of the causes which have reduced the American savage to his present degraded and deteriorated condition.

Reader, if you smoke, chew, or snuff the filthy weed, we would ask you to pause a moment between your whiffs, or before you renew your quid, or take a new pinch of the delectable poison, and consider whether it is worthy of the dignity of an intelligent, enlightened, cultivated human being to spend his money, waste his

time, and squander his health in imitating a vice which originated with ignorant, degraded savages, and remains a relic of barbarism which has been grafted upon civilization.

Chemists, botanists, and physicians unite in pronouncing tobacco one of the most deadly poisons known. No other poison, with the exception of prussic acid, will cause death so quickly, only three or four minutes being required for a fatal dose to produce its full effect. It is botanically known as *nicotiana tabacum,* and belongs to a class of plants known as the *volanaceae,* which includes the most poisonous of all species of plants, among which are *henbane* and *belladonna.* There are more than forty different varieties of the plant, all of which possess the same general properties, though varying in the degree of poisonous character.

Nicotine.—The active principle of tobacco, that is, that to which its narcotic and poisonous properties are due, is nicotine, a heavy, oily substance, which may be separated from the dried leaf of the plant by distillation or infusion. The proportion of nicotine varies from two to eight per cent, Kentucky and Virginia tobacco usually containing six or seven per cent. A pound of tobacco contains, on an average, three hundred and eighty grains of this deadly poison, of which one-tenth of a grain will kill a dog in ten minutes. A case is on record in which a man was killed in thirty seconds by this poison.

A Pound of Tobacco Will Kill Three Hundred Men.— The poison contained in a single pound of tobacco is sufficient to kill three hundred men, if taken in such a way as to secure its full effect. A single cigar

contains poison enough to extinguish two human lives, if taken at once.

The essential oil, nicotine, has more than once been used for homicidal purposes. It was employed by the Count Bocarme to murder his brother-in-law, for the purpose of securing his property.

The Hottentots use the oil of tobacco to kill snakes, a single minute drop causing death as quickly as a lightning stroke. It is much used by gardeners and keepers of greenhouses to destroy grubs and noxious insects.

A number of instances are recorded in which death has been produced by applying a little of the oil from the stem or bowl of an old pipe, to a sore upon the head or face of a small child.

Poisoning through the Skin.—The poison of tobacco is so potent and violent in its action that even the external application of the moist leaves to the skin is sufficient to produce most serious symptoms. If a cigar be unrolled, and the leaves composing it be applied over the stomach, great nausea will be produced in a very short time. This method has been used to induce vomiting. Cowardly soldiers have been known to place tobacco leaves under their arms just before going to battle, for the purpose of producing sickness.

Some years ago a man was detected in an attempt to smuggle a quantity of tobacco by placing the leaves next to his skin. The nearly fatal symptoms which followed, led to the discovery of the smuggler.

Deadly Vapor. — If tobacco is poisonous when applied to the skin, it is doubly so when inhaled. The smoke of tobacco contains, in addition to nicotine, several other poisons, the chief of which are *pyridine*,

picoline, sulphuretted hydrogen, carbon dioxide, carbonous oxide, and *prussic acid,* all of which are fatal poisons when received into the system in any other than the most minute quantities. Thus it is not to nicotine alone that the evil effects of smoking are due, but to all of these poisons combined.

Birds, frogs, and other small animals die when exposed to the fumes of tobacco in a confined space. Cheese-mites, bees, and other insects may be quickly killed by directing upon them a stream of tobacco smoke from an ordinary pipe.

Poisoning through the Lungs.—Inhalation is the most speedy way of getting any volatile poison into the system. The reason of this is obvious when the fact is made known that the lungs present a mucous surface fourteen hundred square feet in extent, every inch of which is in the highest degree capable of absorbing gaseous substances brought in contact with it. This membrane is of the most marvelously delicate character, being of such exceeding thinness that it forms scarcely any obstacle to the passage of gases which enter the lungs by respiration. Just underneath this delicate membrane passes all the blood in the body, or an amount equivalent to the whole quantity of the blood, once every three minutes. The vapory poison inhaled by the tobacco-smoker is not simply taken into the mouth and then expelled, but it penetrates to the remotest air cells, and spreads itself out over the whole of the immense extent of membrane stated. Thus it is plain that the blood of the smoker is literally bathed in the narcotic fumes drawn from his pipe or cigar.

So readily does the system receive the poison of tobacco in this way, that it has repeatedly been observed as a fact that persons who are engaged in the manufacture of cigars often suffer much from the characteristic effects of nicotine poisoning.

When tobacco is applied to the mucous membrane, as in chewing and snuff-taking, its poisonous elements are absorbed in essentially the same manner as when it is applied to the skin, but much more rapidly. In chewing, considerable quantities are also absorbed through the stomach, being swallowed with the saliva.

Poisonous Effects of Tobacco-Using.—Very few users of the weed need to have a description of the effects of a moderate degree of poisoning from tobacco. The giddiness, nausea, and deathly sickness which follow the first attempt to use the drug, are indubitable evidence of the poisonous character of tobacco, which evidence is confirmed by the difficulty, in many cases very great, experienced in becoming addicted to its use. In severe cases of poisoning, violent vomiting and purging, vertigo, deathly pallor, dilatation of the pupil, a staggering gait, disturbed action of the heart, interference with respiration, and in extreme cases insensibility and syncope, are commonly observed. Only a very small quantity is necessary to produce these symptoms in a person not accustomed to its use; but in persons who have habituated their systems to the poison, a much larger quantity is required.

Persons not accustomed to the use of tobacco, often show symptoms of poisoning from taking a very small quantity of the drug, as by inhaling its fumes in a

smoking-car or a barroom. Infants are often sickened by inhaling the air of a sitting-room which is poisoned by a smoking father. There is good reason for believing that not a few infants' deaths have occurred from this cause, as it is well known that young children are exceedingly susceptible to the influence of poisons of all kinds.

Conditions of a Boy Learning to Smoke.—Of course no one has ever examined the internal organs of a boy while he was undergoing the terrible ordeal of "learning to smoke;" but lower animals have been examined while under its influence, and the conditions observed are thus described by an eminent scientist and physician:

"From analogy derived from the inferior animals, which analogy must be very perfect, the conditions of the vital organs are as follows: The brain is pale and empty of blood; the stomach is reddened in round spots, so raised and pile-like that they resemble patches of dark Utrecht velvet; the blood is preternaturally fluid; the lungs are pale as the lungs of a calf, when we see them suspended in the shambles; while the heart, overburdened with blood, and having little power left for its forcing action, is scarcely contracting, but is feebly trembling, as if, like a conscious thing, it knew equally its own responsibility and its own weakness. It is not a beating, it is a fluttering heart; its mechanism is perfect, but each fiber of it, to its minutest part, is impregnated with a substance which holds it in bondage, and will not let it go."

Why All Smokers Do Not Die of Tobacco-Poisoning.—It is often objected that while chemistry and

scientific experiments seem to prove that tobacco is a powerful poison, the experience of thousands of persons disproves the theory of its poisonous character, since if it were so intense a poison as described, cases of death from tobacco-poisoning would be much more frequent.

To this objection we answer: (1) One reason why so few persons are reputed to die of *nicotine,* or tobacco-poisoning, is the wonderful faculty the system possesses of accommodating itself to circumstances. Through this means the worst poisons may by degrees be tolerated, until enormous doses can be taken without immediately fatal effects. Corrosive sublimate, strychnia, belladonna, and many other poisons, may be thus tolerated.

(2) In our opinion, the majority of tobacco-users do die of tobacco-poisoning. Death as surely results, ultimately, from chronic as from acute poisoning, though the full effects are delayed, it may be, for years. A man who dies five or ten years sooner than he should, in consequence of tobacco-using, is killed by the poison just as truly as though he died instantly from an overdose.

Chronic Tobacco-Poisoning.— The symptoms of chronic tobacco-poisoning cannot be better stated than in the following summary by Dr. B. W. Richardson, one of the highest medical and scientific authorities of England:

"Smoking produces disturbances—

"*a.* In the blood, causing undue fluidity and change in the red blood corpuscles.

"*b.* In the stomach, giving rise to debility, nausea, and in extreme cases, sickness.

"*c.* In the heart, producing debility of that organ, and irregular action.

"*d.* In the organs of sense, causing in an extreme degree, dilatation of the pupils of the eye, confusion of vision, bright lines, luminous or cobweb specks, and long retention of images on the retina, with other and analagous symptoms affecting the ear; viz., inability clearly to define sounds, and the annoyance of a sharp, ringing sound like a whistle or a bell.

"*e.* In the brain, suspending the waste of that organ, and oppressing it if it be duly nourished.

"*f.* In the nervous filaments and sympathetic or organic nerves, leading to deficient power in them, and to secretion in those surfaces—glands—over which the nerves exert a controlling force.

"*g.* In the mucous membrane of the mouth, causing enlargement and soreness of the tonsils,—smoker's sore throat,—redness, dryness, and occasional peeling off of the membrane, and either unnatural firmness and contraction, or sponginess of the gums.

"*h.* In the bronchial surface of the lungs, when that is already irritable, sustaining the irritation and increasing the cough."

The above quotation is of peculiar force, coming as it does from a man who is not only well qualified to speak on the subject from his high scientific attainments and large experience, but is peculiarly well fitted to speak authoritatively, and certainly without prejudice against tobacco, himself being, from force of long habit, a smoker.

Dr. Richardson has elsewhere asserted that the injury done to the blood corpuscles by *nicotine* can

be readily detected in the blood of an old smoker by examination with the microscope. He thus describes the changes which are found to take place in the blood of a smoker:

Effects in the Blood.—"The blood is made thinner than is natural, and, in extreme cases, paler. In such instances the deficient color of the blood is distributed to the body altogether, rendering the external surface yellowish white, and puffy. . . . But the most important change is exerted on those little bodies which float in myriads in the blood, and are known as the red globules. These globules have, naturally, a double concave surface, and at their edges a perfectly smooth outline. . . . The absorption of the fumes of tobacco leads to rapid changes in them. Microscopically examined, they are found to have lost their round shape, to have become oval and irregular at their edges, and instead of having a mutual attraction for each other, —a good sign, within certain limits, of their physical health,— they lie loosely scattered. Indeed, they indicate to the learned observer, as clearly as though they spoke to him, that the man from whom they were taken was physically depressed, and deficient in both muscular and mental power."

The fact is established beyond the possibility of successful controversy, that tobacco is a poison, deadly in large doses, pernicious and harmful in all doses. It taints the breath, ruins the digestion, obliterates taste and smell, spoils the blood, oppresses the brain, depresses the heart, irritates the nerves, wastes the muscles, obstructs the liver, dims the vision, stains the skin, and deteriorates and contaminates every organ

and tissue with which it comes in contact in the body. Its influence is to lessen vitality, to benumb the sensibilities, to shorten life, *to kill.*

Tobacco Predisposes to Disease. — By its deteriorating influence upon the system, tobacco lessens the vital resistance of the body to other causes of disease, and so produces a predisposition to nearly all classes of maladies. As bearing upon this point, we may quote the following from eminent authorities:

"Look at the pale face, imperfect development, and deficient muscular power of the inhabitants of unhealthy, malarious districts. They live on, but with only half the proper attributes of life. So it is with the habitual smoker."— *Mr. Solly, F. R. S.*

"I do not hesitate to say that if a community of both sexes, whose progenitors were finely formed and powerful, were to be trained to the early practice of smoking, and if marriage were confined to the smokers, an apparently new and a physically inferior race of men and women would be bred up."— *Dr. B. W. Richardson.*

A British officer in India stated that of eleven officers sent out on an expedition, only two escaped in good health, and they were non-smokers.

In speaking against tobacco, Dr. Edward Smith, the eminent English authority and sanitarian, remarked, "The whole tendency of its action is toward disease, and it is impossible to say how much of good it has prevented."

Smoker's Sore Throat.— The redness and dryness of the mucous lining of the mouth and throat so common with smokers, is the result of the direct irrita-

tion of the hot fumes of the poisonous weed which are drawn in through the pipe or cigar. This cause of this chronic disease of the throat is so very common that "smoker's sore throat" has come to be recognized as a distinct malady. Some smokers pretend to smoke for the cure of throat difficulties; but the excuse is a mere pretense in most cases. Tobacco never cures sore throat. It may temporarily relieve local irritation, but can do no more, and always increases the disease.

Tobacco and Consumption. — The relation of impure air to disease of the lungs is everywhere recognized. It has been very clearly demonstrated that breathing impure air is the great cause of consumption, on account of the effect of poisonous elements upon the blood and the lungs. Even the impurities gathered from the blood itself exist in the air which has been once breathed, in such quantities as to render it unsafe to breathe again. This being the case, it will be readily seen that filling the lungs with the nicotinized smoke and hot fumes of tobacco from a pipe or cigar for several hours a day, cannot but be a most certain cause of lung disease. Moreover, experience shows this to be the case. Dr. C. R. Drysdale, the chief physician to the Metropolitan Free Hospital of London, declared in an article in *Public Health,* that "smoking in youth is no uncommon cause of pulmonary consumption."

Tobacco a Cause of Heart Disease.—The effect of tobacco upon the heart is indicated by the pulse, which is a most accurate index to the condition of the heart. The pulse of the tobacco-user says, in terms as plain

as any words could, that his heart is partly paralyzed, that its force and vigor are diminished, that it is, in fact, poisoned. Old smokers, and not a few of those who have indulged but a few years, often suffer with palpitation of the heart, intermittent pulse, *angina pectoris,* and other symptoms of derangement of this most important organ. There is, in fact, a diseased condition of the heart which is so characteristic of chronic tobacco-poisoning that it has been very appropriately termed "narcotism of the heart." Medical statistics show that about one in every four smokers has this condition. There is good reason for believing that not only functional but organic disease of the heart may be occasioned by the use of tobacco.

Tobacco and Dyspepsia.— Notwithstanding the fact that tobacco is very frequently recommended as a sovereign remedy for dyspepsia, we have become convinced by careful observation in hundreds of cases, that it is never a cure, and is in hundreds of instances a cause of dyspepsia. Tobacco is a narcotic. The effect of narcotics generally is to lessen the secretion of gastric juice, and to decrease the activity of the stomach. This tobacco does in a very marked degree. A man who is hungry may appease his desire for food by using tobacco if he is accustomed to it, or by the employment of some other narcotic. The desire is appeased, although the want still exists. It is through this same paralyzing influence that tobacco impairs digestion. Snuff-taking occasions dyspepsia by producing irritation of the nasal mucous membrane, which affects the stomach through sympathy.

Tobacco a Cause of Cancer.—There is no chance to doubt that tobacco-using is often a cause of this

terrible disease. All eminent surgeons testify that they frequently meet cases of cancer of the lips and tongue which have been occasioned by smoking. A number of such cases have come under our own observation, and we do not doubt that a large share of cancers of the lip and tongue originate in this way. This view is further strengthened by the fact that in the great cancer hospital of London, where more than ten thousand cases of this terrible disease have been treated, the number of men suffering from cancer upon the lip and tongue was three times as great as the number of women so affected, although the female cancer patients outnumber the men, five to one.

Tobacco Paralysis. — Within the last thirty years there has been a great increase in the frequency of the occurrence of a peculiar form of paralysis which seems to affect especially the nerves that supply the muscles, causing gradual wasting and loss of muscular power, which is fairly attributable to the increasing use of tobacco, as it most often occurs in tobacco-users.

A form of progressive paralysis of the optic nerve, causing "tobacco amaurosis," or blindness, is well recognized by oculists. These cases generally recover when the tobacco is discontinued, but will not get well so long as it is used.

Color Blindness, an affection which is increasing to an alarming extent, especially in Belgium and Germany, where smoking is more extensively practiced even than in this country, has been found largely attributable to the use of tobacco. This fact was first announced by an eminent Belgian physician, who made

extensive investigations of the subject at the request of the Belgian government.

Nervousness from Tobacco.—Tobacco-users suffer much from nervousness, which is manifested in a great variety of ways. One person is easily startled; another unnaturally irritable, is cross and irascible; another cannot sleep at night; still another suffers trembling of the hands, which greatly discommodes him in writing. In scores of cases, we have seen these symptoms disappear when the use of tobacco was discontinued. Temporarily, tobacco seems to give tone and strength and steadiness to the nerves; but the seeming strength is deceptive. It is purely artificial, and the ultimate effect is to increase the very difficulty which it seems to cure.

We have often known wives and young children to suffer severely from various nervous disorders which were wholly due to the effect upon their delicate organizations of the poisonous fumes of tobacco which they received through the poison-laden exhalations of their smoking husbands and fathers.

Hereditary Effects of Tobacco-Using.— There is no vice or habit to which men are addicted, whose results are more certainly transmitted to posterity than are those of tobacco-using. A vigorous man may use tobacco all his life, and be able to convince himself all the time that he is receiving no injury; but the children of that man, who ought to inherit from him a vigorous constitution and high health, are instead robbed of their rightful patrimony, and enter upon life with a weakly vital organism, with a system predisposed to disease and destined to premature decay.

The sons of an inveterate tobacco-user are not as robust as their father; and the grandchildren, in case the children are tobacco-users, are certain to be nervous, weakly, sickly creatures. This fact we have verified in so large a number of cases that we make the statement fully prepared to maintain it by indisputable facts.

Dr. Pidduck, an English physician of experience, speaks as follows from his observations on the effects of tobacco at the dispensary of St. Giles:

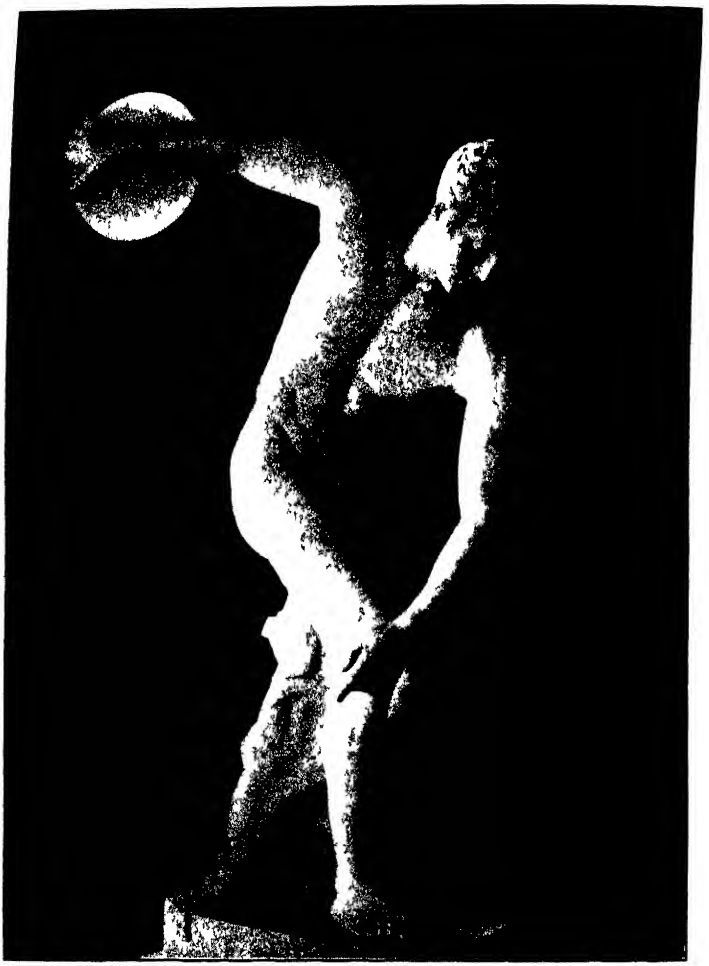
"If the evil ended with the individual who, by the indulgence of a pernicious custom, injures his own health, and impairs his own faculties of mind and body, he might be left to his enjoyment, his fool's paradise, unmolested. This, however, is not the case. In no instance is the sin of the father more strikingly visited upon the children than in that of tobacco-smoking. The enervation, the hypochondriasis, the hysteria, the insanity, the dwarfish deformities, the consumption, the suffering lives and early death of the children of inveterate smokers, bear ample testimony to the feebleness and unsoundness of the constitution transmitted by this pernicious habit."

In addition to the maladies already noticed, we might enumerate a large number of other diseases which are either the direct or indirect result of tobacco-using; but the facts we have adduced are ample to warrant the conclusion that the use of tobacco is one of the worst forms of intemperance, and one of the surest means of producing disease. Every proper means ought to be adopted to prevent the contraction of the habit by the young, and to induce those addicted to it to reform.

"The Devil's Own."— Passing a London cigar store one day, we noticed the above words on a flaming placard as the name of a new brand of cigars just produced by the manufacturers. The name impressed us as exceedingly appropriate, and we wondered that so impressive a cognomen had not before been utilized. The cigar is undoubtedly one of the devil's favorite instruments for converting boys who might become respectable citizens and useful men, into loafers, vagabonds, drunkards, and criminals of every description.

Notwithstanding the repeated exposures which have been made of the dangers to life and health incurred by the use of the filthy weed, the number of its devotees seems to be constantly upon the increase. The tobacco habit must be regarded and treated as a moral disease which has fastened itself upon society,— one of "the devil's own" means for degrading and depraving humanity. How perverted, indeed, are the instincts of the human being who deliberately defiles the image of his Maker till every trace of the divine workmanship is obliterated by the scourge of the stinking weed, and he becomes fit only to be labeled "the devil's own"!

How to Reform. — Stop at once. There are very few persons who possess the strength of purpose and power of self-control to "taper off." The tapering-off process is far more difficult, and is attended by far greater inconvenience, both physical and mental, than the prompt and complete abandonment of the practice. No fear need be entertained that any risk to life will be incurred, although much nervous irritability and even pain may be experienced. Perseverance for a few days will bring victory and release from the tyranny of a vile and degrading habit.



DISCOBOLUS

How to be Strong

AMONG the ancient Greeks and Romans, strength and symmetry of body were held in the highest esteem. Not infrequently, men were chosen to fill the highest positions of authority and influence, when the chief qualification which they possessed was unusual physical proportions and bodily strength. A Roman emperor, while on one of his expeditions, discovered a gigantic barbarian, whom he made one of his generals, and who afterward became himself ruler of the empire. It was natural that the ancients should esteem physical strength so highly, as in warfare the failure or success of an army depended upon the ability and endurance of its soldiers in personal combat. The invention of the fire-arms and artillery of modern times has entirely changed the mode of warfare, so that at the present time the size of a commander's guns and the length of his purse are of even greater consequence than the number of his soldiers.

Decline of Physical Culture.—So, also, the application of machinery to agriculture and to almost all the arts, has greatly diminished the necessity for physical exercise in nearly every branch of human industry, and to such a degree that there is comparatively little demand for mere brute force, and physical development has come to be considered a matter of little

consequence. The decline of physical culture has undoubtedly had much to do with the loss of that symmetry of form which obtained its perfection among the ancient Greeks, as shown in the Apollo, the Venus de Milo, and other specimens of ancient Greek art.

The modern sculptor who wishes to produce even an approximation to the standard of excellence presented in the ancient models, finds himself quite unable to secure a living model suitable for his purpose, but must make a composite figure by combining the parts of a large number of different subjects, drawing a leg of one, an arm of another, a neck of another, etc.

This degenerative process is rapidly developing a race of deformed and decrepit human beings, who are so different from their ancestors of two or three thousand years ago that they might almost pass for a different species. Each generation seems a little weaker, physically, than the one that preceded it; and the puny, pale-faced boys of to-day, with lank, feeble bodies, active but unbalanced brains, irritable nerves, and precocious propensities, make a poor outlook for the generation to come.

Strong Muscles Win.—Notwithstanding the great and essential difference between the conditions of modern life as compared with the life of the Greek or Roman citizen of two thousand years ago, it is still true that the man of physical strength and soundness is the one who, other conditions being equal, wins the prizes in almost every department of human life. Notwithstanding the many apparent exceptions to this rule, such well-known examples as those of the English premier, Gladstone, M. Thiers, Victor Hugo, Will-

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until it becomes a mere stick, simply bone covered with skin, the muscles having entirely wasted away.

We depend upon continued daily exercise for the ease with which we move about. If the hand is hung up in a sling for a few days, the whole arm speedily becomes almost useless. On removal of the sling, even after so short a time as one week, the elbow will be found to be stiff, and the muscles stiff and rigid, and any attempt to move the arm painful. We frequently find the muscles of the body in the same condition as that of such an arm when we undertake to make some unusual movement, such as bending backward or sidewise. We discover that the muscles newly called into action are surprisingly weak, and that their use, even for a short time, may be followed by soreness and discomfort for many days. When little or no exercise is taken, the whole body speedily falls into the same condition of feebleness and uselessness.

A person who for any reason is confined to his bed for a number of days, quickly discovers this when he first stands upon his feet or undertakes to engage in the ordinary exercises to which he has been accustomed. He finds immediately, on assuming a perpendicular position, a strange weakness in his legs, perhaps a slight light-headedness due to a sudden flow of blood to the lower portions of the body, leaving an insufficient supply in the brain. Perhaps the limbs will tingle with the increased quantity of blood sent into them, while palpitation may lead the patient to fear that he is suffering with some grave trouble of the heart, which has been heretofore undiscovered. If such a person returns to bed, as is not infrequently

the case, and waits for strength to come to him, he will grow weaker and weaker continually, until he may become permanently helpless. We have frequently had such cases brought to us for treatment, sometimes on beds, from long distances. In some instances the individuals had been confined to their beds for eight or ten years, during which time they had scarcely taken a single step. Careful investigation of each case showed it to be one in which the chief fault was weakness of the muscular system, the result of disuse. By a properly graduated course of exercises, the muscular power was gradually recovered, and the patient was restored to usefulness.

It is in cases of this sort that the so-called "magnetic healers," "mind healers," etc., so frequently obtain brilliant results. Recognizing a case to be of the sort described, they profess to perform some curative act for the benefit of the patient, thereby inspiring his confidence, and arousing his hope and expectancy to the highest degree, and succeed in getting him upon his feet; and, each time gaining a little strength, the muscles are soon restored so as to enable the operator to pronounce the patient cured.

Benefits to be Derived from Exercise.— Exercise is beneficial in a variety of ways.

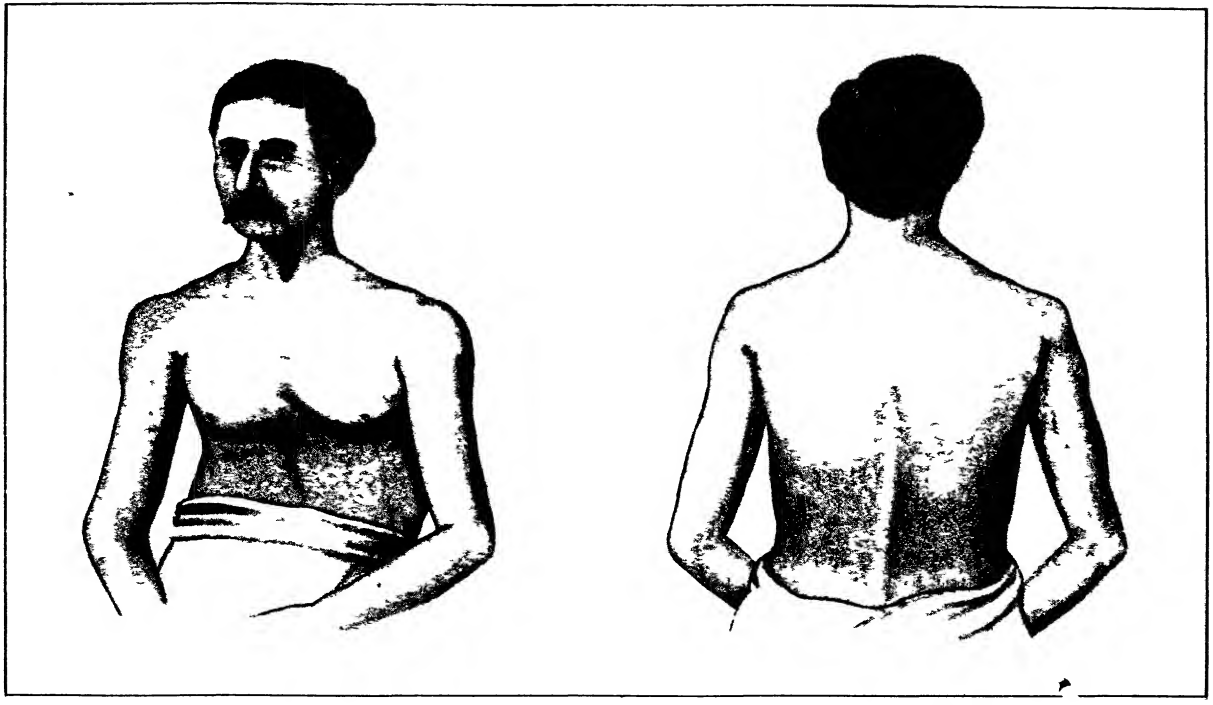
As we have already seen, it develops the muscles. The muscles, as we have elsewhere learned, are composed of very minute fibers, each of which has the power to contract. In a muscle which is not used, these fibers become thin and pale, and lose, to a large degree, their power of contracting. In a well-developed muscle, they are large and ruddy, and possessed of

a high degree of elasticity and energy. When a thin, feeble muscle is thrown into action by contraction, it soon loses its pale color, and acquires a deep red color, through the increased quantity of blood which flows through it during its activity. The supply of fresh blood brings with it new nourishment, from which the fibers may replenish themselves. If the exercise is repeated sufficiently often to bring to the muscle an adequate amount of nourishment, the growth may continue until a very unusual degree of development has been attained.

The famous Dr. Winship, by persistent, systematic exercise, succeeded in developing his muscles to such a degree that he became able to lift, by the aid of shoulder straps, fully three thousand pounds,—a load which the stoutest cart horse could scarcely stand up under. In his youth, Dr. Winship was so inferior in physical development that, when a student at school, he was obliged to bear patiently most provoking insults from his schoolmates, because unable to make a good physical defense. He himself said that it was this fact which gave to him the impulse to undertake the course of physical culture which resulted in his extraordinary development.

A good set of muscles is one of the most excellent qualifications which a young man can possess. There is no position in life for which they unfit him, and there is none which they will not enable him to fill to better advantage than he otherwise could do. There are a thousand and one emergencies in life in which strong, vigorous, and well-trained muscles are of enormous service, and in which their use may be of incalculable

THE MUSCLES



HOLLOW CHEST

STOOPING SHOULDERS

value. Proper physical culture gives, not only increased physical strength, but greater dexterity, suppleness, and grace of movement. The man who walks with a shuffling, swaying, and awkward gait, does so, not on account of any original defect in his physical make-up, but through the weakness of certain muscles which, by disuse, have become unable to do their part in the act of walking, and so render him unable to perform it in an easy and graceful manner. The trained gymnast exhibits a lightness and elasticity of movement impossible to an individual who has not had the benefit of physical training.

Round Shoulders and Flat Chest.—Proper training of the muscles also prevents or corrects various bodily deformities, such as round shoulders, flat and narrow chests, and crooked backs, and gives to the body an erect and graceful carriage. Many of these deformities are directly or indirectly productive of interference of the body in general through interference with the proper working of the various vital organs, particularly the lungs; and hence physical culture does more than simply add to the comeliness of the body and grace of movement; it really increases the vital capability of the body, and hence lengthens life, as well as rendering it more joyous.

A round-shouldered person is one who is simply carrying his chest behind instead of in front of him. This deformity is not necessarily indicative of a weak chest or small lungs, but rather of weak back muscles and the habit of sitting in a stooped or relaxed position. This habit naturally results from much sitting at study, writing, the keeping of accounts, and similar

occupations. Most persons who sit much, or whose employment naturally tends to a stooped position, are round shouldered. This condition is nearly as common among farmers, whose occupation is chiefly out of doors, as among clerks, students, and business men, because of the careless habit farmers have of sitting in a stooped position in driving or when resting from active work. Even athletes are not infrequently very round shouldered. This deformity not only gives a person a weak and ungraceful appearance, but lessens the breathing capacity, and leads to inactivity of the upper part of the lungs, thus inviting consumption and other diseases, which arise from the lodgment of germs in contact with inactive and weakened portions of the lung tissues.

Persons who have flat chests or round shoulders should sleep on a hard mattress, on the back, if possible, with a very thin pillow or none at all.

Correct and Incorrect Sitting Attitudes. —When a person sits with the chest flattened, and the shoulders rounded, the muscles of the trunk are relaxed. The breastbone, or sternum, and the ribs are depressed in front, and the result is a pushing downward of the stomach, liver, and other abdominal organs. The abdominal muscles are relaxed so that they afford no support to the viscera, and the certain consequence is congestion. Sooner or later, serious disease of the liver, stomach, bowels, and other abdominal organs is certain to appear.

When one sits erect, as shown in the plate, the chest is elevated, the abdominal muscles are drawn in, the internal organs are held up in their proper posi-

Incorrect and Correct Sitting Positions

tions, and the movement of blood through these organs is active, and their functions normally performed.

The correction of an improper position in sitting, and the cultivation of an erect attitude, with full, deep breathing, will be found in itself sufficient to cure many a backache, sideache, headache, and a considerable part of the indigestion, heaviness, and the accompanying distresses from which multitudes suffer, and for the relief of which quantities of nostrums are swallowed in vain. A proper sitting position is of the highest importance as a means of correcting this deformity. Parents and teachers should admonish the children under their care to "sit tall," to reach their heads up as high as possible, and should take the advice to themselves.

In sitting, the seat should be of the proper height, so that the feet may be squarely placed upon the floor, and supported without undue pressure upon the under side of the leg. When the lower extremities hang over the edge of the chair, the blood circulation is interfered with, the nerves are pressed upon, and the limbs become numb and cold, or "go to sleep," to use the common expression. To avoid this discomfort, the occupant of a seat which is too high slips forward and reclines in his seat. This is an exceedingly bad position, resulting in relaxation of all the muscles of the trunk, and extreme flattening of the chest.

It is well to bear in mind that one should never lie down when sitting up, but should maintain an erect position. The chest should be well raised forward, and the abdominal muscles well drawn in. To do this will at first require attention and an effort. One must every

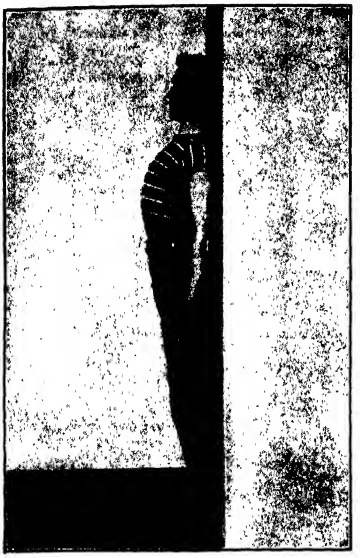
few moments correct his position. After a while the habit of correct sitting will be acquired, and great advantages healthwise will thereby be gained.

One of the obstacles to assuming and maintaining a correct position in sitting is a weak, overstretched condition of the muscles of the back. Correct sitting is a splendid exercise for these muscles, but certain exercises aid greatly in developing them. It is worse than useless to say to a round-shouldered person, "Put your shoulders back." The proper thing to do is to instruct him to *put the chest forward.* His shoulders will then naturally fall back in the effort to balance the body. The shoulders may be put back without in the slightest correcting the deformity.

The correct standing position is shown in the accompanying plate. This position is easily acquired by a little practice. The improvement in health and personal appearance is so great as to make it worth while to make the effort to obtain a good poise and graceful carriage. First of all, it is necessary to get a correct idea of the erect position. With the aid of a teacher, this can be acquired in a few minutes. Having no teacher, one may employ a wall as a trainer.

Standing against the wall, facing the center of the room, place the heels, hips, shoulders, and back of the head firmly against the wall. Reach the arms downward as far as possible, holding them to the sides with the thumbs turned outward. The door, or the side of a doorway, is more convenient than a plastered wall, as there is no baseboard.

While keeping the heels and hips against the wall, bend the head backward as far as possible, keeping



c

a, b. c. EXERCISES TO CORRECT STANDING POSITION.

d

CORRECT SITTING POSTURE.

the longer the wrong position is maintained. In the cases of students, bookkeepers, editors, and those who do desk work, these organs are almost certain to be found out of place.

It has been said, "We should never lie down when we are sitting up." In the ordinary chair, complete relaxation results in distortion of the body and prolapse of the internal parts, and interferes with respiration. But the new chair renders it possible to relax without this distortion of the trunk and the evils which result, by affording the body such support as will maintain the natural attitude without the expenditure of too much muscular energy. This is accomplished by the introduction of three important principles:

1. By giving the back of the chair a special curve carefully compared to the natural contour of the human spine by means of hundreds of drawings made from living subjects.

2. By giving the back of the chair a special angle whereby the trunk is inclined backward to such a degree as to carry the head backward sufficiently to make it serve, in connection with the muscles of the neck, as a lever, acting upon the upper part of the chest and lifting it upward and forward. This lifting of the chest renders tense the muscles of the abdomen, whereby the abdominal viscera are lifted upward and held in their normal places. The efficiency with which this is accomplished is clearly shown by Figures 1 and 2, which represent the same person sitting in the Sanitas chair and in an ordinary chair. The center of the back is in contact with the chair in both cases. This is necessary in order that the chair

FIG. 1

FIG. 2.

THE SANITAS CHAIR.

should afford such support to the trunk as is required to give rest to the muscles. As soon as the muscles of the trunk relax, as they do necessarily when weary, the trunk being acted upon by gravity naturally falls into a position which may require mechanical support. The illustration shows the position of a person seeking to maintain the proper form of the trunk while at the same time receiving support from the back of an ordinary chair. The impossibility of maintaining such a position is apparent. The muscles soon become weary, the trunk relaxes, and the body falls into the position shown in the cut.

3. Still another principle which enters into the construction of Sanitas chairs is the angle of the seat. In most chairs, the seat is so nearly horizontal that as soon as a person relaxes his muscles in the sitting position, there is a tendency to slide forward. The farther the hips are removed from the back of the chair, the greater is the distortion of the trunk when the spine is allowed to come in contact with the back of the chair.

In the new chair, the seat slopes back sufficiently to prevent slipping forward. Care is also taken to see that the height is such as to permit the feet to rest squarely upon the floor. It is far better that the seat should be a little too low than that it should be a little too high. A too high seat compresses the blood-vessels and nerves which pass along the under side of the leg, interfering with the circulation and causing numbness and sometimes painful sensations in the lower extremities.

Muscular exercise not only improves the health and strengthens the muscles, but directly and indirectly

affects in a favorable manner nearly every organ of the body. The muscles aid in supporting the various bones which compose the skeleton, in their proper positions. When the muscles become weak, they relax, and allow various portions of the body to drop into uncouth and unhealthful positions. It is thus that the shoulders become rounded, being allowed to drop forward through weakness of the muscles which are intended to hold them back in position. The ribs, which form the framework of the chest, not being properly pulled forward and outward through contraction of the muscles attached to them, gradually fall inward, thus flattening the chest, and compressing those important breathing organs, the lungs. By proper exercise, these physical defects may be prevented, and entirely remedied in most persons who have not yet attained middle age. Even in advanced years, much may be done to correct these physical deformities, by properly directed and systematic efforts.

Still more remarkable is the effect of exercise upon the activities of various internal organs. The effect of muscular exercise in increasing the action of the heart and lungs is well known. A brisk run will often double the activity of the heart, and much more than double the activity of the lungs. Although the number of respirations per minute may be only double in number, the depth of inspiration, the amount of air taken in at each breath, is also greatly increased, so that the total amount of work done by the lungs is very much more than doubled. This increased activity of the lungs produces a wonderfully beneficial effect upon the whole body.

The heart is a pump which distributes to the tissues the vital fluid by which it is to be replenished. When the heart works more rapidly and vigorously, a larger amount of blood is furnished to every organ in the body, and the tissues are consequently more liberally supplied with nutriment, and more thoroughly renovated.

Not only is a larger amount of new material carried to the tissues, but the old, worn-out waste particles are removed much more thoroughly, being carried to the organs whose business it is to remove them from the body as they are eliminated, or thrown off. Thus the body is kept freer from the waste or effete matter which results from the wear and tear of the system.

The lungs, by their increased activity, introduce into the blood and veins of the whole system a larger quantity of oxygen, the great purifier, which vivifies the blood, vitalizes the tissues, and cleanses every nook and corner of the vital domain. Every activity is quickened. The whole system is infused with a higher grade of vitality. The bodily machinery runs at a higher speed, and with greater effectiveness for work. The brain, freer from the products of waste, and supplied with more highly vitalized blood, is able to do better thinking. The liver, having a larger amount of oxygen and a better blood supply, can do more bile-making. The stomach, having its activities quickened by a larger and richer blood supply, secretes a better quality of gastric juice, and more of it, and hence is able to digest a larger quantity of food, and to more perfectly elaborate it and prepare it for entrance into the blood.

Exercise Assists Digestion.—Exercise aids digestion by creating an appetite, promoting the secretion of the digestive fluids, and increasing the peristaltic movements of the intestines. When God said to Adam, "In the sweat of thy face shalt thou eat bread," the command was given to the entire race to engage in active muscular labor. Those who seek to avoid sweating, or who neglect to take habitual active exercise, are punished by ill health. The apostle Paul said, "If any would not work, neither should he eat." Nature says the same by removing the desire for food or the power to digest it. The inactive man who is still able to eat and digest, runs great risk from the accumulation in his body of unnecessary or unused material, which clogs the vital machinery and fills the blood with poisons whereby its resistance and that of the body are diminished. Nature takes away the appetite and lessens digestive vigor to avoid this danger. When an idle or sedentary man throws away this protection by stimulating the palate by means of condiments and a constantly renewed variety of stimulating foods, he is working at cross purposes with God, and will certainly suffer the penalty of disobedience.

Thus we may see that the wise man uttered a profound physiological truth when he declared, "By much slothfulness the building decayeth." Eccl. 10:18. The body temple is worn by work, but is at the same time renewed, so that work is a means of constant body change or renovation.

The value of a brisk walk on a cold, frosty morning in developing the appetite for breakfast, is well known by every one. Life out of doors may be justly

INCORRECT AND CORRECT POSITIONS IN BUCK SAWING.

regarded as one of the most important means of promoting health and securing sound digestion and proper assimilation of the food. Exercise also aids digestion by promoting activity of the bowels, whereby the body rids itself of waste matters, lack of attention to which may result in chronic poisoning, a condition from which thousands constantly suffer who might find complete and entire relief by the simple means indicated.

Exercise quickens the stream of life, increases the action of the heart, lungs, stomach, liver, and every vital organ; and by cleansing away the rubbish which accumulates in the tissues as the result of work, prepares the way for new material, and so is one of the greatest of all means of promoting life and health. All examples of extraordinary longevity which have been reported have been of persons who had led active, even laborious, lives, and whose habits in diet and in other respects were simple and regular.

Thus, every part of the body seems to take on new life and activity; and, to a person who has previously been in a state of inaction, with his system torpid and clogged by the products of wastes which have not been properly eliminated, the change is almost equivalent to a new birth.

After having once tasted of the delights of living on a higher plane, with all his sensibilities quickened, and his ability for enjoyment and appreciation of the pleasures and blessings of life so greatly increased, one could hardly be induced at any price to return to the old sluggish and inane existence.

A "Good Wind."— In these days of hurry and bustle, when a moment gained or lost may mean the

loss or gain of a fortune, or even of a human life, the possession of a good "wind," which will support brief, or, if necessary, prolonged, active muscular exercise, as in hurrying to catch a train, running to a fire, or to rescue a person in danger, is a matter of inestimable value. Two things are essential for a good wind: (*a*) A sound and vigorous heart; (*b*) large and strong lungs. If either of these organs is deficient, a person, on trying to take a little more active exercise than usual, will speedily find himself "short of breath." The heart is a muscle, and the lungs are filled and emptied by means of muscles, which act upon the chest in such a way as to use it like a pair of bellows, alternately compressing and expanding its walls so as to make the air pass out and in. Muscular exercise causes the heart to beat faster, and by this means strengthens it, just as the other muscles of the body are strengthened. By special exercise, the muscles which operate the chest may be strengthened, and the chest itself may be enlarged so that it will receive an increased quantity of air, and will have greater freedom of movement in the act of breathing.

Soundness of wind is one of the essential qualifications for a good walker or a good horseman; and it is for the purpose of securing this reliability of the heart and lungs that the long course of training to which persons who are preparing themselves for pedestrian or rowing contests, are subjected, is entered upon. Time is required to enable the heart to grow large and strong enough to do the necessary amount of work required of it during the contest, and to allow the lungs to expand to such a capacity as to supply the greatly increased quantity of oxygen required.

A Weak Heart.—Every now and then we read in the newspapers of a man who has dropped dead in hurrying to catch a train. Such an occurrence is the result of a weakness of the heart, arising from the want of proper training to enable it to support the activity of the other muscles of the body. The heart ought to be able to do its work as well as the other muscles, and should be capable of doing it well, even when the other portions of the muscular system are excited to the highest degree of activity.

A person who is not accustomed to exercise, finds almost immediately, on attempting to take a little exercise, that the blood rushes to his head. He is seized with a violent beating of the heart, and feels as though he were in imminent danger of death. All these inconveniences, however, speedily disappear under systematic exercise, gradually increasing its vigor as the heart and blood-vessels acquire greater tone, so that they are not so readily disturbed by muscular efforts.

How to Test the Heart.—If you feel the pulse of a person not accustomed to exercise, while he is sitting quietly, and then ask him to run quickly up and down the stairs two or three times, and count his pulse again, it will be found to have increased in frequency anywhere from thirty to fifty beats per minute; while the pulse of a person accustomed to vigorous exercise, counted after the same amount of exercise, may not have increased more than ten to fifteen beats per minute.

By these simple means, any one may test his heart strength, and while taking a course of muscular training, may discover the gradual increase in heart tone,

as indicated by the lessened effect of exercise in increasing the pulse rate.

Probably more than half the business men of the country who have reached middle age could not run rapidly for a mile without incurring considerable risk, and certainly not without feeling afterward badly used up. Every man ought to be able to run two or three miles at the rate of eight miles an hour, without suffering any serious inconvenience.

Physical exercise gives better command of the whole body; and when properly conducted, trains both sides of the body alike, and so almost doubles the efficiency of the muscles. A man who has been trained in the ordinary way, really uses his left side but very little. Everything requiring skill, strength, or dexterity must be done with the right hand. Even the right limb usually has enough more training to make it a little larger than the left. The extra amount of work done by the right side of the body results in increasing the strength of the muscles of this side, and in deformity of the spine, which is made to curve toward the left side, causing the right shoulder to drop a little. There is probably not more than one person in four who does not have this deformity.

With proper physical training, both sides of the body will be equally developed, and should be equally useful. A man who is ambidextrous, or able to use both hands equally well, will not only be able to do more work in a day or in a year than a man who can employ but one hand, but in the case of the loss of one hand, he does not meet with so utter and complete a loss as the man who loses his one trained hand.

INCORRECT AND CORRECT POSITIONS IN CROSS-CUT SAWING

Even the brain and nerves share in the benefits derived from muscular training. When a muscle contracts, it is in obedience to the impulses originated in the brain, sent to the muscles along a nerve trunk. Hence, muscular exercise also implies exercise of the brain and nerves. The same law which induces muscular growth as the result of exercise, applies also to the exercise of the brain and nerves. Hence, muscular exercise, instead of detracting from mental development, as might be supposed, actually encourages the development of the brain, and increases its capacity for action. This is undoubtedly the reason why muscular exercise has so marked an effect in steadying the nerves, giving to one self-command, mental equipoise, and readiness. Nothing so well prepares one for readiness of action in emergencies as thorough training of the muscles.

The derivative effect of muscular exercise renders it one of the most efficient means of counteracting the effect of laborious mental occupation and such employments as are likely to cause an excessive flow of blood to the brain. When the muscles are active, they are capable of containing a much larger proportion of blood than when idle, and thus drain it away from the brain and nerve centers, which, through excessive and prolonged activity, may have become congested and surcharged with blood. On this account, regular, systematic exercise is of the greatest value to students and to professional men. Thousands of men break down before completing their education, or just after graduation; and thousands of clergymen, lawyers, professors, and other brain workers, make disastrous fail-

ures in consequence of the onset of some nervous disorder, which might have been entirely prevented if the brain and nerve centers had been cooled and rested by regular systematic exercise.

Another of the valuable benefits to be derived from muscular exercise is to be found in its effects upon those portions of the nervous system which control the purely animal functions. An individual whose brain is excited and irritated by too much blood, the result of excessive brain work or worry, is vastly more likely to become a prey to the torments of propensities or passions clamoring for gratification, than he who, by active muscular exercise, relieves the brain of blood, thereby producing that gentle fatigue which is so conducive to rest and calmness of mind and body and soundness of sleep.

It is a noticeable fact that many wandering barbarous tribes, who depend for their sustenance upon the uncertain results of the chase and meager vegetable products, are vastly less addicted to gross vices, even though their food is largely of an animal character, than are more civilized people, whose mode of life requires of them less muscular exercise. This fact alone emphasizes the importance of encouraging muscular exercise among the youth of the present day, since the growing tendency to vice and licentiousness among all civilized people is one of the most conspicuous and lamentable features of the present time.

General Rules for Exercise.—1. Exercise, to be really valuable, must be systematic; that is, it must be taken in such a way as to bring into play all the muscles of the body in a natural and symmetrical

manner, or, in case the exercise is taken to correct deformities or special weaknesses, it should be such as will be best calculated to accomplish the desired end.

2. It must be taken regularly. The way most business men take their exercise, going off on a hunting expedition once a year for one or two weeks, or now and then taking a very long walk or a tiresome rowing excursion, is not calculated to strengthen the muscles, but rather to make them sore and stiff, and to discourage efforts in this direction.

Exercise should be taken daily. The system requires its daily dose of muscular exercise as much as its daily portion of food; and it would be quite as sensible to undertake to do a month's eating in a single day as to take all of one's exercise for a month on a monthly holiday. Hence, exercise should be taken daily, and if possible, at a regular hour.

3. The best time for taking exercise is about ten o'clock in the forenoon; but for an ordinary individual, the best time is at such an hour as will enable him to take it at the same time every day, thereby allowing the system to accustom itself to periodical muscular work, and so acquire the greatest amount of benefit from it. As a rule, especially with weak persons, a large amount of exercise should not be taken before breakfast. Persons who have a weak digestion often suffer ill effects from taking long walks before breakfast, becoming so "faint" that the relish for food is lessened, as well as the power to digest it. For those who have active duties requiring their attention during the usual business hours, exercise may be divided between morning and evening, as half an hour before

breakfast and an equal length of time before going to bed.

4. The amount of exercise should be such as will produce genuine fatigue. At the beginning, the exercise should be taken very moderately indeed, and the person should stop short of complete exhaustion. Weak muscles, in particular, should be exercised with very great care. Many persons become discouraged in their efforts in the direction of physical culture by attempting to do too much at first. In consequence of very violent exercise, the muscles are made sore and stiff, and they become discouraged, and give up the attempt in disgust.

At no time, during a course of physical training, should the exercises be so violent as to be exhausting; but they should be so gradually increased that the heaviest exercise at the last will be no more taxing than the very lightest at the beginning. This requires that the amount of muscular work done should be so carefully graduated that the muscles will have time to develop increased capacity as the work is increased.

A story is told of an ancient Roman who developed enormous strength by placing upon his shoulder a young calf, and carrying it around the ring of a great amphitheater. This he did each day; and as the calf grew in size, his strength increased proportionately, until at last he was able to shoulder the full-grown ox, and carry it about the great arena with almost as much ease as he had at first carried the animal when but a few days old.

5. Much greater benefit is derived from light exercises repeated many times, than very violent exercises

repeated but a few times, or engaged in only for a brief length of time. By lifting heavy weights, or indulging in such exercises as are too heavy for the muscles, they may be strained and even permanently injured; while by the employment of light exercises, though the body becomes fatigued, no such mishaps can possibly occur, and no permanent injury will be likely to be done.

Conspicuous examples of the benefits to be derived from systematic daily exercise are afforded by a number of eminent men of modern times, some of whom have already been mentioned.

Gladstone as a Wood-Chopper.—Gladstone, for example, was almost as famous for his fondness for and dexterity in chopping wood as for his skill in diplomacy. Though he was upward of eighty years of age, the venerable statesman continued as active as ever, and the quality of his speeches in the House of Commons showed not the slightest sign of physical or mental deterioration. When worn with the labor and care of political life at London, he ran away to his home in the country, and spent a few days in hewing down the giant oaks for which the place is famous.

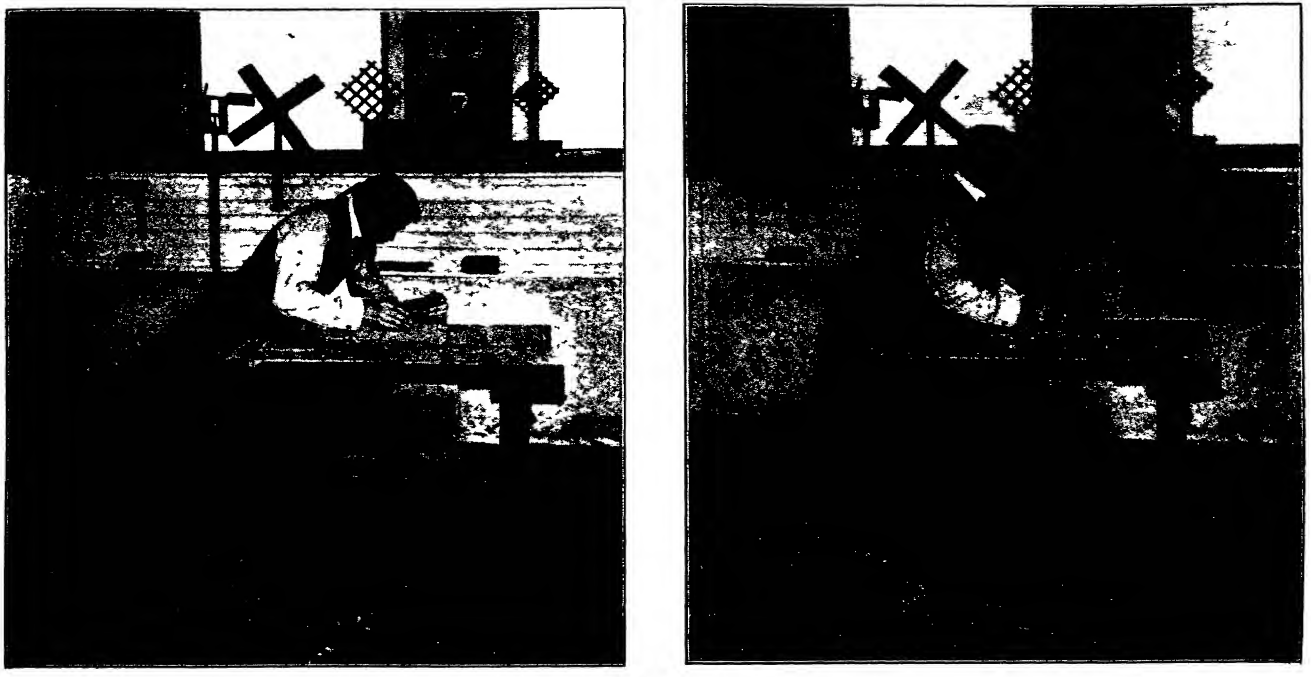
Dickens as a Pedestrian.—Dickens was almost as noted as a pedestrian as he was distinguished as a novelist. His daily habit was to walk nine or ten miles before breakfast, and he sometimes prolonged his walk to twenty-five or thirty miles before taking his morning meal. If he had not been given to great excesses in eating, it is probable that he might have prolonged his active literary life many years; but he was cut off at an age when most men of science are doing their best work.

Byron, though addicted to many vices, and even to the grossest dissipation, was a most faithful observer of the laws of health which relate to physical exercise, taking habitually a daily run into the country, and engaging in rowing, swimming, and other active physical exercises. He carried his physical training to such a degree of perfection that he was able to accomplish some feats in swimming which have rarely been equaled. It is quite probable that his attention to physical exercise, together with his habitual abstemiousness in diet, at least during long periods, enabled him to resist as long as he did the evil influences of the enormous excesses to which he was addicted.

Maclaren, the English apostle of physical education, in his excellent work on the subject, gives several illustrations of the remarkable effects of exercise in modifying the development of the body, a few of which we quote:

"Twelve non-commissioned officers, ranging in age from nineteen to twenty-nine years, were sent to me for training. I made careful measurements of the chest, arms, shoulders, limbs, etc., and repeated the measurements at intervals throughout the course of training, to ascertain the amount of progress made." He states the result as follows:

"The muscular additions to the arms and shoulders and the expansion of the chest were so great as to have absolutely a ludicrous and embarrassing result; for before the fourth month, several of the men could not get into their uniforms, jackets, and tunics without assistance, and when they got them on, they could not get them to meet down the middle by a hand's breadth.



INCORRECT AND CORRECT POSITIONS IN PLANING.

In a month more they could not get into them at all, and new clothing had to be procured, pending the arrival of which the men had to go to and from the gymnasium in their great-coats. One of these men had gained five inches in actual girth of chest. Now, who shall tell the value of these five inches of chest,—five inches of additional space for the heart and lungs to work in? There is no computing its value, no power of computing it at all; and before such an addition as this could be made to this part of the body, the whole frame must have received a proportionate gain. For the exercises of the system are addressed to the whole body, and to the whole body equally; and before this addition could be made to the chest, every spot and point of the frame must have been improved, every organ within the body must have been proportionately strengthened.

"But I tried another method of recording the results of the exercises. I had these men photographed, naked to the waist, shortly after the beginning of the course and again at its close, and the change in all, even in these small portraits, is very distinct, and most notably so in the youngest, a youth of nineteen, and, as I had anticipated in him, not merely in the acquisition of muscle, but in a readjustment and expansion of the osseous framework upon which the muscles are distributed.

"But there was one change, the greatest of all, and to which all other changes are but means to an end, are but evidences more or less distinct that this end has been accomplished,—a change which I could not record, which can never be recorded, but which was

to me, and to all who had ever seen the men, most impressively evident; and that was the change in bodily activity, dexterity, presence of mind, and endurance of fatigue,—a change a hundredfold more impressive than anything the tape measure or the weighing chair can ever reveal."

Exercise Encourages Growth.—The same eminent authority also gives the following illustrations of the effect of exercise in stimulating growth:

"A remarkable instance of this came under my observation a few years ago. A youth whose growth had for some time been stationary at the height of five feet two and three-eighths inches, suddenly, from the practice of systematized exercise, began to grow at a fair and regular rate, and at the age of twenty-one, when he went to India, his height was five feet six and a fourth inches. Another instance is that of a schoolboy whose growth had been all but arrested from a severe fall in childhood. Almost instantly, systematized exercise started his latent powers of growth, and in nine months he had grown eight and seven-eighths inches."

The eminent poet, William Cullen Bryant, who died a few years ago at the advanced age of eighty-four years, preserved his wonderful physical and mental vigor to the very last, by a system of regular physical exercise, which he thus described in a letter to Mr. Joseph H. Richards, a few years before his death, and which was published after his decease:

"My Dear Sir: I promised some time since to give you some account of my habits of life, so far, at least, as regards diet, exercise, and occupation. I

am not sure that it will be of any use to you, although the system which I have for many years observed seems to answer my purpose very well. I have reached a pretty advanced period of life, *without the usual infirmities of old age,* and with my strength, activity, and bodily faculties, generally, in pretty good preservation. How far this may be the effect of my way of life, adopted long ago and steadily adhered to, is perhaps uncertain.

"I rise early, at this time of the year about half-past five; in summer, half an hour, or even an hour, earlier. Immediately, with very little encumbrance of clothing, I begin a series of exercises, for the most part designed to expand the chest, and at the same time call in action all the muscles and articulations of the body. These are performed with dumb-bells, the very lightest, and covered with flannel, with a pole, a horizontal bar, and a light chair swung around my head. After a full hour, and sometimes more, passed in this manner, I bathe from head to foot. When at my place in the country, I sometimes shorten my exercises in the chamber, and, going out, occupy myself for half an hour or more in some work which requires brisk exercise. After my bath, if breakfast is not ready, I sit down to my studies till I am called. . . .

"After breakfast, I occupy myself for a while with my studies, and then, when in town, I walk down to the office of the *Evening Post, nearly three miles distant,* and after about three hours, return, always walking, *whatever be the weather or the state of the streets.* In the country, I am engaged in my literary tasks till a feeling of weariness drives me out into the open air,

and I go upon my farm, or into the garden and prune the fruit trees, or perform some other work about them which they need, and then go back to my books. *I do not often drive out, preferring to walk.*"

A former business associate gave to a newspaper representative the following, among other reminiscences of Mr. Bryant, with whom he had been acquainted forty years:

"During the forty years that I have known him, Mr. Bryant has never been ill,— never been confined to his bed, except on the occasion of his last accident. His health has always been good.

"Mr. Bryant was a great walker. In earlier years, he would think nothing of walking to Paterson Falls and back, with Alfred Pell and James Lawson, after office hours. He always walked from his home to his place of business, even in his eighty-fourth year. At first he wouldn't ride in the elevator. He would never wait for it, if it was not ready for the ascent immediately on his arrival in the building. Of gymnastic exercises, he was very fond. Every morning, for half an hour, he would go through a series of evolutions on the backs of two chairs placed side by side. He would hang on the door of his bedroom, pulling himself up and down an indefinite number of times. He would skirmish around the apartment after all fashions, and once, he told me, even 'under the table.' Breakfast followed, then a walk down town; and then he was in the best of spirits for the writing of his editorial article for that day."

In view of such facts, where is there a young man of energy and intelligence, and for such only we write,

INCORRECT AND CORRECT POSITIONS IN SHOVELING.

who is not willing to devote the little time and effort required to develop for himself that soundness of body, that suppleness of limb, that hardness of muscle, that grace and dignity of carriage, that soundness of digestion, and that vigor of intellect which can be obtained only by regular, systematic, vigorous muscular training? The question may arise, "Will not ordinary labor answer the purpose as well as special exercises?" In reply to this question, we have to say, Many kinds of labor afford a sufficient amount of bodily exercise to secure a good appetite, a vigorous digestion, and many other good results of exercise; but there are very few trades which do not, to a greater or less degree, destroy the symmetry of, if they do not more seriously deform, the body. For example, the farmer, from the enormous amount of back-work he has to do in stooping forward and lifting with a fork and shovel, pulling the rake, swinging the scythe, etc., becomes round-shouldered. The back muscles become enormously developed, while the muscles of the front of the chest are neglected. Thus it is that we find so large a proportion of persons who are past middle age, presenting round shoulders, flat chests, and a backward curvature of the spine. The blacksmith develops one arm and one side of the chest enormously, but gives so little work to the other that he really becomes in time deformed. The oarsman develops the muscles of the back and forearm, and gives to the upper-arm and muscles of the front of the chest an insufficient amount of work; consequently, the shoulders become pulled forward. The fingers, also, in continually clasping the oars, become more or less permanently crooked and their bones stiffened. The

average farmer also has an awkward gait, and is slow and awkward in his movements generally.

It thus appears that the laboring man, as well as he whose employments are sedentary, requires exercise for the purpose of counteracting the deforming tendencies of his particular vocation, and for preserving a well-balanced development of his body.

How to Make a Home Gymnasium.—The idea that expensive appliances and apparatus, and perhaps a building constructed expressly for the purpose, is required to enable a person to avail himself of the advantage of special exercise, has deterred many from undertaking a course of physical training. It is of the utmost importance in the interests of physical education that the public mind should be disabused of this erroneous notion. The truth is that the most essential and effective forms of exercise can be taken by the aid of little or no apparatus of any description, or at least other than that which can be afforded by any home, and which is accessible to any one under almost all circumstances. However, the expenditure of a few dollars and a little labor will provide a few simple devices by means of which the work may be made more interesting and in some respects more effective. Hence, we shall describe a few appliances which it is desirable that every home should contain.

Every home ought to have its family gymnasium,—a room set apart for daily exercise, which may be used by the members of the family. Such a room should contain:

1. Apparatus for pulley-weights, which consists of a long box set upright against the wall, and divided

perpendicularly into two compartments, which are open in front. At the top of each compartment is placed a pulley, over which passes a rope, with one end attached to a wooden box about six inches deep and of sufficient size to fill the compartment. At the other end of the rope is placed a handle to grasp with the hand. Weights of different sizes can be put into the box so as to regulate the amount of work done in pulling them up and down. Chest weights can now be obtained so cheaply from various gymnasium supply houses that it is better to buy an apparatus than to make one. The expense will be found less, and the apparatus more satisfactory.

2. Erect two solid posts about three feet broad. Place between the two posts, properly secured at a point as high as can be reached by the hand, a round bar about one and one-half inches in diameter. The bar may easily be made adjustable, so as to accommodate persons of different heights. Secure on the inside at a point about opposite the waist, a stout round pin about one and one-half inches in diameter, projecting from the post about eight or nine inches. A doorway may be used instead of the posts.

3. Obtain a sound piece of ash or hickory about three inches wide, two inches thick, and six feet in length. Place this against the base board at one side of the room, and secure one end firmly to the floor. Above the free end of the strip, and high enough to be opposite the breast, fasten to the wall a block about four inches square and two inches thick. Obtain a fork handle about three feet in length. Bore a half-inch hole about one-third its length from one end, and

pass a bolt through the handle into the block. By means of a stout rope, attach one end of the round piece to the free end of the strip upon the floor.

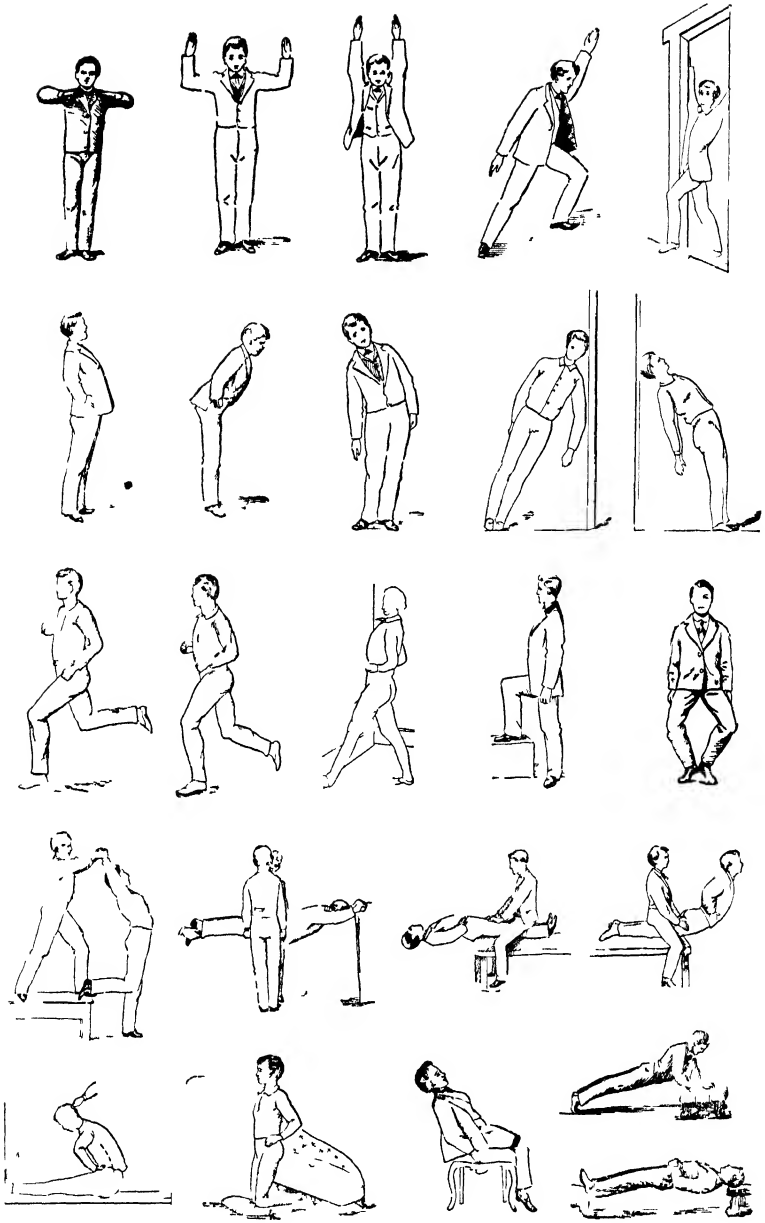
4. Obtain a dozen iron weights weighing from one to ten pounds each. If iron weights cannot be easily procured, stone or lead may be employed; or bags filled with salt or sand, with the weight marked upon each, may be used instead.

5. If possible, obtain two or three pairs of dumb-bells, one pair weighing five pounds each, another weighing eight pounds, and still another weighing twelve pounds.

By means of these simple appliances a very large proportion of the muscles may be brought into full and vigorous action.

Many persons imagine that it is of very little consequence what form of exercise is taken, provided a person takes a sufficient amount to insure activity of the circulation, and secure an appetite for food. This is a grave error. A man might sit down by the road side, and spend ten hours a day breaking stones with a hammer, as men may often be seen doing on the roadways of England, and the active exercise may give him a good appetite, sound digestion, and strong muscles in his right arm; but the result would be that the rest of his body would, through neglect, become seriously deformed. His limbs would become stiff, and his gait feeble and awkward, and all symmetry of form and grace of movement would be lost.

In order that the body should be properly developed, it is important that each individual shall take such special exercises as are particularly adapted to



SWEDISH GYMNASTICS

(From "Swedish Movements or Medical Gymnastics," by Dr. Hartelius, of Sweden.)

his case, and in such amount as the general system, or the organs specially involved, may demand. By this means, particular deficiencies or weaknesses may be corrected.

Forms of Exercise.—The limited space which we have to devote to this subject will admit only a brief description of a few of the simplest and most valuable forms of exercise. Fortunately, the most important forms of physical exercise can be taken with very little apparatus, and are very simple in character. Various forms of exercise and simple apparatus for use in taking exercise are illustrated in accompanying plates.

Walking.—This simplest of all forms of exercise is one in which a large number of the muscles of the body are brought into gentle action, in maintaining the erect position of the body, and propelling it forward. In ordinary walking upon a level surface, the body is not lifted, but is inclined forward in such a way as to make it necessary for the feet to be advanced, first one and then the other, in order to preserve the body from falling. Walking is a valuable form of exercise, but is so gentle in character that a large amount must be done, at least several miles a day, to constitute a fair amount of exercise.

Walking, to be beneficial, must be graceful. There are very few good walkers, since few persons have an equable muscular development, which is necessary for a graceful carriage in walking. If the limbs are weak, the gait is tottering. If there is weakness of the muscles of the waist, the body sways from side to side in walking. Weakness of the muscles of the front of

the trunk cause the head and shoulders to be thrown forward.

How to Walk.—To walk healthfully, first make the body erect by throwing the shoulders well back and the chest forward, holding the head erect and drawing the chin in a little. This will straighten the muscles of the back, and give to the body an erect carriage. Let the arms swing easily by the side, with the palms open and turned inward. In stepping forward, place the foot down firmly, letting the heel touch first, then the toe. Avoid a tottering gait by keeping the knees well set back. Put vigor and elasticity into the step. At the beginning, let the pace be moderate, and the distance not greater than can be accomplished without severe fatigue. Gradually increase the distance and the speed until able to walk four or five miles an hour. The amount of exercise obtained in walking may be regulated by the speed and distance of the walk. The amount of work done may be increased by carrying loads of different weights, either in the hands or upon the shoulders.

Running, leaping, and hopping are modifications of walking which afford much more vigorous means of exercise than ordinary walking. A person who has not been accustomed to violent exercise of any sort, should carefully avoid an excessive amount of this kind at the beginning of practice. In running, the gait should at first be very moderate, and the distance traversed short, so as to give the heart and lungs opportunity to become strong enough to sustain the increased effort required of them during this active exercise. The same observation holds good respecting

Fig.

Fig 2

Fig. 3.

Fig. 4.

RUNNING.

hopping and leaping. The proper positions in running are shown in the accompanying plate.

How to Swim.—Swimming is one of the most useful of all forms of physical exercise, for the reason that it brings into activity the muscles which are not ordinarily employed. Man seems to be the least adapted to progression in the water of any animal. Other animals, the dog, for example, is so naturally formed for swimming that he does not have to learn to swim. The horizontal attitude of the body and the natural elevation of the head above the line of the spinal column, together with the small size of the head compared with the remainder of the body, and the favorable position of the nose, which is lifted free from the water, while leaving almost the entire remaining portion of the body submerged, renders it very easy for an animal to keep afloat. The movement of the limbs of a dog in swimming are precisely the same as in walking; he simply walks in the water, holding his nose high, and does not have to trouble himself with modifying his movements to suit the element in which he is moving, whether in the air or in the water. With man this is different. In the water he must move his limbs in a way in which he has no occasion to move them when on the land. The consequence is that when he makes his first attempt to swim, he finds the muscles which he must necessarily use, weak and easily exhausted; therefore, learning to swim requires much practice and considerable time.

The great health advantage in swimming is in the fact that the head must be carried well backward, and the arms must be used in a way which will develop

the shoulder retractors, or the muscles which draw the shoulders backward; hence it is one of the finest of all means for developing the chest, and overcoming the tendency which exists among all sedentary persons to become round-shouldered.

Swimming thus constitutes a most healthful form of recreation. It is refreshing, promotes appetite, and is one of the most valuable of all accomplishments. The majority of deaths from drowning are due to the lack of knowledge of this useful art. A few practical hints about how to learn to swim may be found of value, in connection with the accompanying cuts. The old method of teaching a boy to swim was to throw him into water deep enough to drown him, making it, with him, a case of "sink or swim." The modern method, however, is more humane. The following is the one commonly employed in teaching swimming in the modern swimming-schools:

The Movements.—There are three movements for the arms and two for the legs, the movements for the arms starting with the position for the arms shown in Fig. 1.

At the first movement, the arms are carried outward at the sides to the position shown in Fig. 2, the palms facing backward.

At the second movement, the arms are brought from the position shown in Fig. 2 to that shown in Fig. 3.

At the third movement, the arms are thrust directly forward to the position shown in Fig. 4.

The time occupied in movements 2 and 3 together is the same as that of movement 1 alone.

The two movements of the legs are as follows:

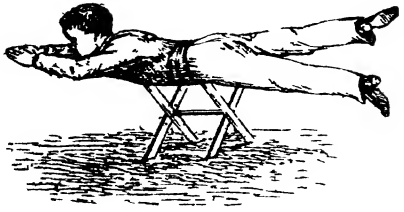


Fig 1.—First Position in Swimming

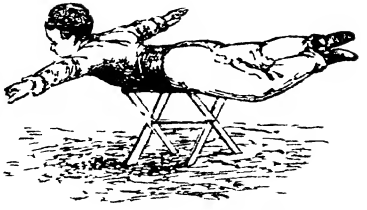


Fig 2.—Second Position

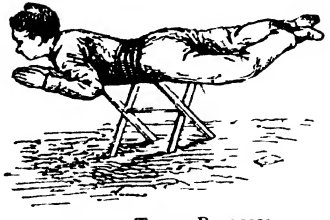


Fig 3.—Third Position

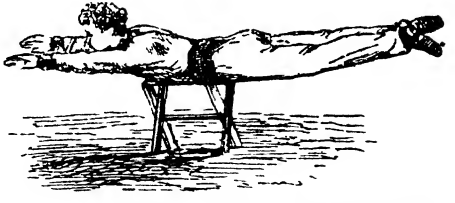


Fig 4.—Changing from First to Second Position

During the first movement of the arms, the legs remain straight out, as in Fig. 4. During the second movement of the arms, by which they are brought to the position shown in Fig. 3, the knees are flexed, and the legs drawn up. For strong swimming, the knees are drawn well up under the body, a position which cannot be assumed except in the water, or with the body suspended by a belt. The second movement of the legs is executed with the third movement of the arms, the legs being thrust downward and outward, assuming at the end of the movement the position shown in Fig. 1.

By the aid of a teacher, these movements may be easily acquired by the following method: The pupil being placed in water not higher than his shoulders, seizes one end of a stick, the other end of which is held by the teacher, who stands in a boat or upon a pier. The first thing the pupil should do is to acquire the ability to balance himself in the water. A firm hold upon the stick enables him to maintain his position, and by degrees he learns to flex the back in such a manner as to keep the head above water and the heels near the surface.

Having acquired his balance in the water, and gotten the idea of the position to be assumed, the pupil takes his first lesson in leg movements. In swimming, the arm movements and leg movements are executed together, with the exception that the first arm movement is made without simultaneous movements of the legs, the two movements of the legs being executed only with the second and third arm movements. In order to establish the proper rhythmical movement,

the teacher counts for these combined movements, "One—two—three, one—two—three, one—two—three," the time given to "two" and "three" being each one-half that given to "one." In counting for the leg movements, only "two" and "three" are counted, a pause of equal time being substituted for "one."

After practicing the leg movements for a few minutes, the pupil is supported in the water by means of a belt passed around his body in such a position as to balance him in the water. The belt is attached to a rope supported at the end of a stout pole, one end of which is grasped by the teacher, who thus supports the pupil in the water very much as he might a large fish attached by his back to a hook and line suspended at the end of a long pole. The pupil is now made to execute the arm movements, keeping time to the count, "One—two—three, one—two—three," the movements being made in the order above described. After practicing the arm movements for a time, the arm and leg movements should be combined, remembering that the leg movements are made only with the second and third arm movements, the legs resting in the position shown in Fig. 4 during the first movements of the arms.

After the pupil has acquired a little confidence, and has learned to combine the movements fairly well, he is provided with a swimming-belt and cast loose into the water to navigate himself. In a short time, if he has given good attention to his instruction, he will be able to move about in the water with ease and confidence. Then the floating power of the belt may be gradually decreased, either by lessening the number of corks, or, if an inflated rubber belt is used, by letting out, from time to time, a little air.

It is well for pupils to practice the above-described movements by resting the center of the body upon a small raised platform or a camp-chair, as shown in the accompanying cut. By this means the muscles employed in swimming may be developed, and the ability to co-ordinate the proper movements may be increased, so that much more rapid progress will be made while the pupil is in the water.

Lessons in swimming should constitute a part of the regular course of education in our public schools; and if teachers would sometimes arrange to take classes of boys and girls separately, to a suitable place, being careful to surround the exercise with proper precautions, it might be made not only interesting and healthful, but the knowledge thus gained prove of much benefit all through life. There is not one boy, and probably not one girl, in a hundred who would not be delighted with the opportunity thus afforded them of engaging in a natural and healthful exercise, and at the same time becoming proficient in the art of swimming.

Dumb-bell Exercises.—The dumb-bell is a very useful appliance for exercising the arms. It was used by the ancient Greeks, who gave much attention to exercise of all sorts. Two systems of exercises are employed with dumb-bells, one requiring light bells made of wood; the other, heavy bells made of iron. For active and prolonged exercises of the arms, wooden bells are to be preferred; but for exercises intended to develop particular muscles, iron bells, properly adapted to the strength of the individual, are much preferable. In the use of iron dumb-bells, the weight should at first not exceed one-twenty-fifth that of the

body. It may be increased until at the end of five or six months, the weight of each bell is one-tenth that of the body. Thus, a person weighing one hundred and twenty-five pounds should, at the beginning, use dumb-bells weighing five pounds each, and should gradually increase the weight to twelve and one-half pounds. For most of the exercises in which dumb-bells are used, bags of shot, cobble-stones, or other objects, the weight of which has been determined, may be used with equally good results, though they are far less convenient.

Exercises with Dumb-bells.—The positions of the arms in taking some of the various forms of exercise may be readily seen by reference to accompanying cuts. In using bells the following program may be followed:

Position: Heels together, knees well set back, shoulders thrown back, head erect, chest well expanded.

1. Grasp a bell in each hand (wooden dumb-bells); bring the hands to the sides, with the palms in front; twist arms half around and back four times, bringing hands to the hips with the last movement.

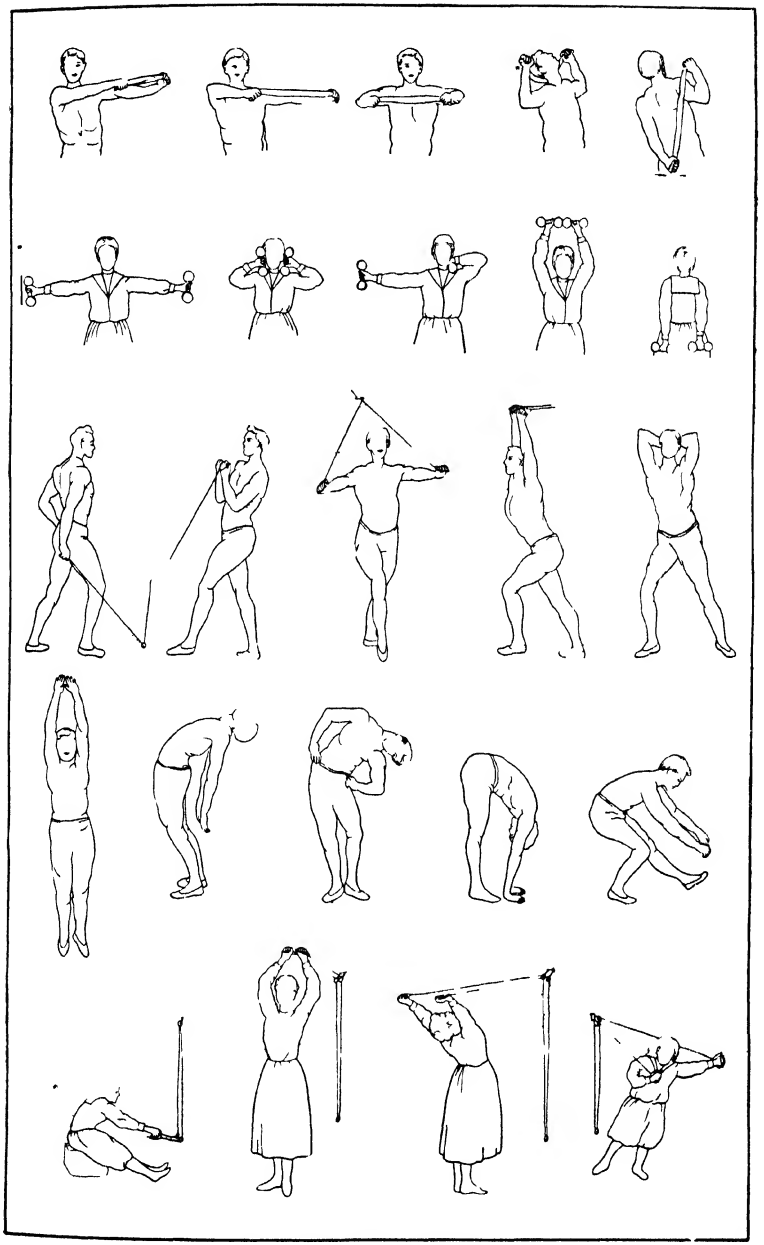
2. Arms extended at the sides, palms inward; turn bells and return four times.

3. Arms extended to the front; palms upward; turn bells four times.

4. Arms extended directly up from the shoulders, palms front; turn four times, bringing bells to the chest with last movement.

5. Bells on chest near the shoulders; thrust right hand down to the side and return four times.

6. Repeat with left arm, keeping the right in position.



ARM AND TRUNK EXERCISES

7. Alternate the two hands, each twice.

8. Thrust both hands downward four times.

9. Bells at armpits. Thrust the right hand down to the side four times, keeping the left in position.

10. Repeat with left hand.

11. Alternate the two hands, each twice.

12. Thrust down both hands four times.

13. Place bells on shoulders. Thrust right hand up four times.

14. Repeat with left hand.

15. Alternate the two hands, each twice.

16. Thrust both hands upward four times.

17. Bells at sides, palms inward; swing each hand up to horizontal four times.

18. Repeat with left hand.

19. Alternate each twice.

20. Swing both at once four times.

21. Hands at sides, palms inward; bring right hand up in front to horizontal four times.

22. Repeat with left hand.

23. Alternate the two hands, each twice.

24. Swing with both hands four times.

25. Hands at side, palms inward; swing each hand backward as far as possible four times.

26. Repeat with left hand.

27. Alternate with two hands, each twice.

28. Swing both hands four times.

29. Arms horizontal, palms inward; swing right arm up to perpendicular.

30. Repeat with left hand.

31. Alternate with two hands, each twice.

32. Swing both arms together to perpendicular four times.

33. Extend arms in front, palms inward; swing each hand up to perpendicular.

34. Repeat with the left hand four times.

35. Alternate the two hands, each twice.

36. Swing both hands together four times.

37. Hands extended in front, palms inward; swing right hand back as far as possible four times.

38. Repeat with left hand.

39. Alternate the two hands, each twice.

40. Swing both hands together four times.

41. Hands at the sides, palms forward; swing each hand to perpendicular four times.

42. Repeat with left hand.

43. Alternate the two hands, each twice.

44. Swing both hands four times.

Anvil Chorus.—A pleasant variation of the exercise with wooden dumb-bells may be made by striking the bells together, as indicated in the following program:

1. Extend left arm in front, holding the right bell touching the shoulder blade back of the head. Strike left bell down with the right, allowing the right bell to fall in same position as that of the left, bringing the left into the position previously occupied by the right. Repeat same with left bell, and thus alternate four times.

2. Hands at sides; palms outward. Swing arms to perpendicular, striking bells together over head four times.

3. Repeat No. 1.

4. Strike bells in front, then behind, each four times.

5. Repeat No. 1.

6. Extend arms in front. Strike the upper end of the left bell with the lower end of the right bell. Repeat with left bell. Alternate thus four times.

The exercise should be accompanied by counting thus: One and, two and, three and, four and; and then repeating. The time may be kept by the aid of music, which is especially serviceable where several are taking the exercises together. Polkas, marches, or any well-accented instrumental music in two-four or four-four time is suitable.

Numerous other exercises may be taken with dumb-bells besides those described; and the exercises may be varied by assuming various positions, such as stepping out in front with one foot or to the side or behind.

Indian Club Exercises.—The Indian club, like the dumb-bells, has been in use from remote times.

Indian club exercises are less easily learned than exercises with dumb-bells, but well repay the trouble required to become familiar with them. We have not space here to describe more than a few of the simpler movements.

1. Grasp the clubs firmly, allowing them to hang at the sides, palms inward; swing the right club up to horizontal in front; repeat four times. Do the same with the left arm. Alternate the two arms, swinging each twice. Swing both together four times.

2. Hands at the sides; swing right arm up to horizontal at the side. Repeat four times with left arm.

Swing with arms alternately, each twice. Swing both together four times.

3. Place both arms together, horizontally in front. Follow same order of movements, swinging clubs to the perpendicular.

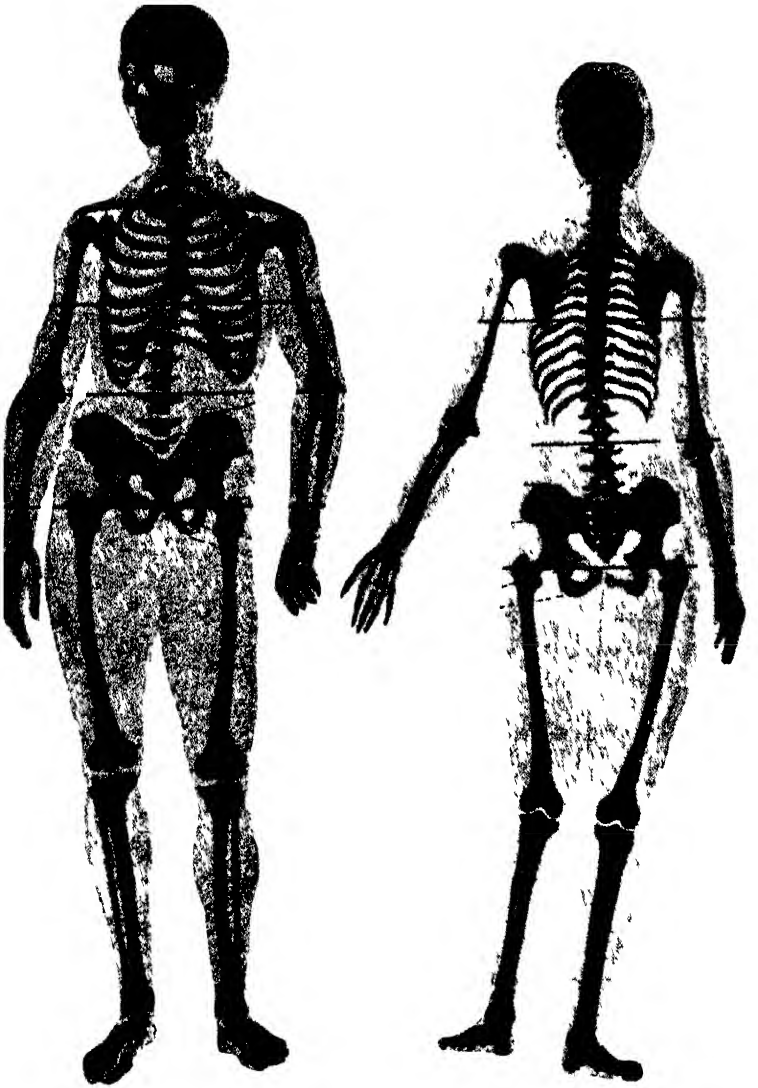
4. Placing the arms horizontally at the sides, repeat the same movements.

5. Place the clubs at the sides; swing right arm to perpendicular four times. Repeat with left arm. Alternate the two arms, swinging each twice. Swing both arms together, four times.

6. Hold the clubs in front horizontally. With the right arm make a sweep to the back as far as possible in a horizontal plane, and return to position; repeat four times. Do the same with the left arm. Alternate, swinging each twice. Swing both together four times.

7. Arms extended in front. Without bending the elbow, by a motion of the wrist bring the right club over toward the arm, allowing it to strike the arm, then carry it back into the original position. Do this four times. Repeat with left club, then alternate each club twice, and do the same with both together four times.

A very large variety of more complicated exercises with Indian clubs may be easily learned from works devoted to the subject. These exercises are specially serviceable in strengthening the muscles of the back and shoulders, expanding the chest, and correcting a tendency of the shoulders to fall forward.



Masculine Form

Feminine Form

EXERCISES TO DEVELOP PARTICULAR PORTIONS OF THE BODY.

To Strengthen the Arms. — The muscles of the arm are in more constant use than almost any other of the voluntary muscles; yet the amount of labor required in a great share of the exercises in which they are employed, is so small that they are often soft and flabby, and the arms poorly developed, notwithstanding their great activity. By the aid of special exercises, the arm may be developed to a very remarkable degree. A poorly developed arm lacks the graceful lines of beauty which are so conspicuous in the ancient Grecian models of the human form.

The Forearm. — The forearm, or that portion of the upper extremity between the elbow and the wrist, is used in all exercises which require holding objects in the hand. This part of the arm is especially used in such exercises as hammering, planing, chopping, and driving. Pulling one's self up by the hands requires a powerful effort on the part of these muscles. But this is too powerful exercise for a beginner. Twisting movements of the arms, such as Exercises 1 to 4 with dumb-bells and Exercise 7 with Indian clubs, are excellent means of developing the muscles of the forearm. Rowing, lifting, and carrying heavy weights in the hands are all exercises which strengthen the forearm.

The Inner Side of the Arm.—When the arm is bent, a mass of muscle can be felt by placing the other hand upon the arm between the shoulder and the elbow. When the muscles are relaxed, the flesh is soft; but

when it is brought strongly into exercise, it is felt to contract and to harden under the hand. This muscle is known as the biceps. It is used in all movements which flex or bend the forearm, and is strengthened by nearly all exercises which develop this part. Exercises with dumb-bells are particularly adapted to develop this muscle:

1. Take in the hands a pair of iron dumb-bells about one-twenty-fifth the weight of the body. Place the hands at the sides, standing with the chest well expanded and the head up. Slowly raise the dumb-bells up from the sides to the shoulders, and return to position. Repeat. After a few moments, rest and repeat the exercises until the dumb-bells have been raised and lowered forty or fifty times. As the strength increases, make the dumb-bells heavier, until those weighing ten to fifteen pounds each are used.

Exercises 5 to 16, made slowly with iron dumb-bells, rapidly increase the strength of the muscles used.

2. Pulling weights, arranged so that the handles hang from the ceiling, may be used with excellent effect to strengthen these muscles. The handles should be high enough so they can be just grasped with each hand. The weights should be light at first, but should be gradually increased. Bring the right hand down to the shoulder and return four times. Repeat the same with the left hand, the two hands, and then use both together. Repeat many times until the muscles have had work enough to make them tired. A single pulley-weight, drawn from above the head down to the breast, using both hands, may be usefully employed in alternation with the double pulley-weights. Lifting weights

with the hands, holding weights at arms-length, climbing a rope and hanging from a bar, or drawing one's self up by the hands, are excellent exercises for these muscles. The last-named exercise should not be attempted, however, until the muscles have been made strong by carefully graduated exercises, which may be advantageously taken with the single pulley, increasing the weights from day to day until a weight equal to one-half that of the body can be readily lifted with one hand; then the whole body may be lifted by grasping a horizontal bar placed high enough above the head so it can be just reached, drawing the body up until the chin is level with the bar. Repeating this exercise several times will give the biceps all the work they require.

The Outer Side of the Arm.—This portion of the arm is more likely to be neglected than any other. When these muscles are not properly developed, the arm lacks that symmetrical roundness and plumpness which a well-developed arm possesses. The following are excellent exercises to strengthen them:

1. Grasp the dumb-bells in the hands, and place them upon the shoulders. Keeping the left hand in position, carry the right hand to the horizontal and back slowly. Repeat four times. Do the same with the left hand. Alternate, and use both together, repeating as many times as desired.

2. Place a couple of chairs back to back and about two feet apart. Stand between the chairs, place one hand on the top of each chair, grasping them firmly. Draw the feet up from the floor. Now let the body down, bending the arms. Straighten the arms, thus

bringing the body back to position, still holding the feet clear from the floor. Repeat the movement. This exercise is known as "dipping." It is one of the most efficient means of bringing the muscles of the outer arm into active exercise. At the first attempt, two dips will be sufficient to make the muscles thoroughly tired. The number should be gradually increased until forty or fifty dips can be made without touching the feet to the floor. When this can be accomplished, the muscles employed may be considered in good condition. Such exercises as pushing heavy weights and striking a sand bag with the fist are well calculated to develop the muscles of this part of the arm.

The Shoulders.—The front and sides of the shoulders are vigorously exercised in holding weights at arms-length, and swinging the ax in chopping. Dumb-bell Exercises, Nos. 17 to 44, and Indian Club Exercises, Nos. 1 to 6, are particularly useful in developing the shoulders. The upper and back part of the shoulders and upper part of the back may be developed by the use of dumb-bells, pulley-weights, and particularly by rowing. The following excellent exercises strengthen these muscles:

Grasp the dumb-bells (iron dumb-bells). Place them at the sides, carrying the arms backward as far as possible. Stooping work, combined with lifting, such as shoveling, breaking stone, and many other laborious occupations, develops these muscles powerfully. Lifting weights, when the body is erect, brings strongly into exercise the large muscle at the back of the neck.

The Fingers.—The fingers may be strengthened by lifting weights, grasping by the thumb and fingers only, or holding the weight with one finger by means of a ring or loop; by the use of the pulley-weights, using one finger only, instead of the hand; by supporting the body in a hanging position, grasping the edge of a board, as a rafter in the garret, or a floor joist overhead in the cellar.

To Develop the Sides of the Waist.—A man who is weak at the sides of the waist sways from side to side as he walks, particularly when walking fast; hence these muscles may be strengthened by rapid walking. Hopping, first on one foot and then on the other, continuing the exercise until one-half or three-fourths of a mile can be traversed in this way, is an excellent means of strengthening the muscles of the sides of the waist. Walking on the edge of the top board of a fence, or the iron rail of a railroad track, or a tight rope, with a balance pole, gives these muscles very active and improving exercise.

Balancing a weight upon the head while walking is also an excellent means of strengthening the muscles of the waist, as well as of the neck and back. The erect carriage of the peasant women in Germany, Italy, and Southern France, and of many of the native negro tribes in Africa, is due to the practice cultivated from childhood of carrying burdens upon the head. Among the native Arabs erect carriage is a universal characteristic. Some years ago, in visiting Jerusalem, the author took great interest in watching the long lines of camels entering at one of the city gates, each surmounted by a turbaned Arab, sitting erect as a pillar,

swaying back and forth with the long, lurching stride of the camel, but never once losing his erect poise. Mr. Floyd, the well-known tourist guide, informed the author that this erect carriage is greatly cultivated by the Arabs, and that in associating with the Arabs in their native encampments he had often heard the fathers reprimand the sons for not retaining the upright position when sitting, or a good carriage when walking.

The muscles of the sides are called into vigorous action in energetic walking, with body erect and shoulders back, especially if the feet are raised high in stepping.

To Strengthen the Muscles of the Abdomen.—The following exercises are particularly good to strengthen these muscles:

1. Sit on the side of a chair, placed close to the wall, so that the toes may touch the base board. Sit erect with the body rigid. Place the hands upon the hips. Let the body fall slowly backward, and after a few seconds, return to an erect position. After some practice, the body can be lowered to a horizontal plane and restored again to position with great ease. The exercise should be repeated a greater number of times as the muscles become stronger.

2. Fasten a couple of loops to the base board, each large enough to admit the foot. Place a low stool at such a distance from the wall that when one sits upon it with the limbs extended, the feet can be placed in the loops. Now place the hands upon the hips, and sway the body back and forth.

3. Lie on the back on the floor or on an ordinary bench. Fill the lungs by taking a deep breath. Keep the legs stiff. Place the hands upon the hips. Raise the trunk slowly to the perpendicular, and slowly return to the horizontal. Repeat several times. The vigor of this exercise may be much increased by placing weights upon the shoulders.

4. Stand erect. Place the hands upon the hips, and bend backward as far as possible. Then bring the body to the perpendicular. This not only exercises the abdominal muscles, but stretches them when they have become contracted, and corrects flatness and posterior curvature of the spine, which are indicated by a sunken-in appearance of the lower part of the chest.

5. Other exercises, such as swinging clubs, using dumb-bells, chopping, pushing with the hands, etc., also strengthen these muscles.

To Strengthen the Back and Loins.—A person who is weak in the back needs such exercises as will strengthen the muscles on either side of the spine and the lower part of the trunk. These very important muscles are called into action in nearly all kinds of work. One who is weak very easily strains the muscles by some extra exercise, giving rise to much pain and suffering, which shows the importance of making them stronger by special exercise calculated to develop them.

1. Sit upon a stool with the feet secured by loops fastened to the floor. Place the hands upon the hips, and bend the body slowly forward and back to position several times. Bend the body backward in the same way, and to either side, repeating each movement a number of times. Or, stand erect, the feet half or two-

thirds of a yard apart. Clasp the arms above the head, and sway the body back and forth and from side to side.

2. Standing against the wall, place the hands upon the hips and bend the head down as far as possible without bending the knees. If the muscles of the back are rigid, it would be well to have an assistant press the head down a little farther when the body has been bent as much as possible.

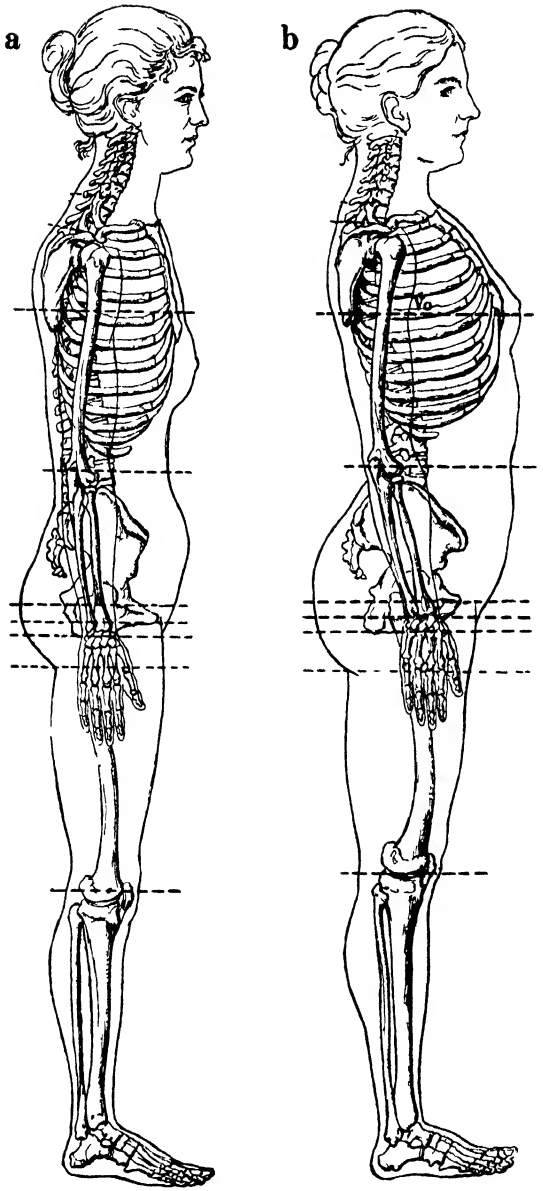
3. Stand a foot or two from the wall. Lean against the wall, supporting the body by the head, keeping the trunk and limbs rigid.

4. Place two low stools far enough apart so that the difference between them will be about six inches less than the height of the body. Now lie down, and place the feet upon one and the head upon the other, so that the body will be supported between the two.

5. Kneel upon the floor with the thighs and trunk erect, and the feet placed under the edge of a heavy sofa or some other similar support. Now inflate the lungs, and bend forward to the floor. Return to position and repeat.

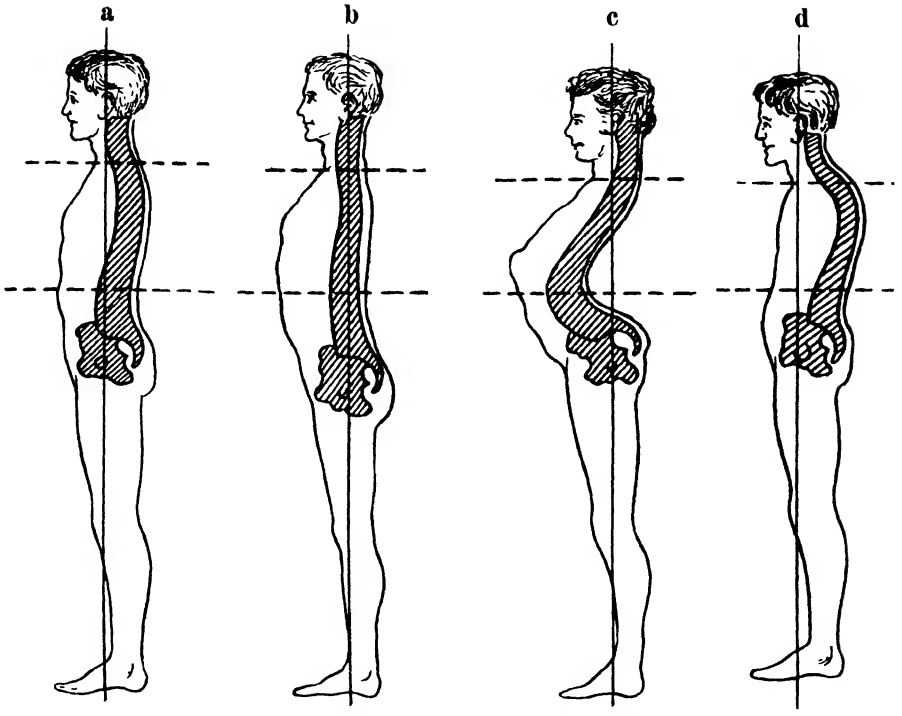
6. The muscles of the loins are developed by the use of dumb-bells, Indian clubs, and pulley-weights, as well as by such occupations as hoeing, shoveling, lifting, carrying weights, etc.

To Expand the Chest.—Attention should be given to the chest, in connection with all other exercises, by taking care to keep the shoulders back, and filling the lungs before taking any exercise. The following exercises are calculated to broaden the chest:



a Flat Chest from Improper Sitting Position b Normal, Well Developed Woman

FEMININE PHYSIQUE



CORRECT AND INCORRECT DEVELOPMENT.

1. The use of dumb-bells at arms-length, with the head thrown well back, and the face looking toward the ceiling.

2. Long and deep breathing, many times repeated, the effect of which may be increased by drawing in and expelling the air through a small tube.

3. Swinging by the hands from a horizontal bar, or from the top of a door.

4. Standing in a doorway, place the hands upon either side above the head. Raise one foot and place it forward, at the same time energetically throwing the whole trunk forward. Repeat the movement several times.

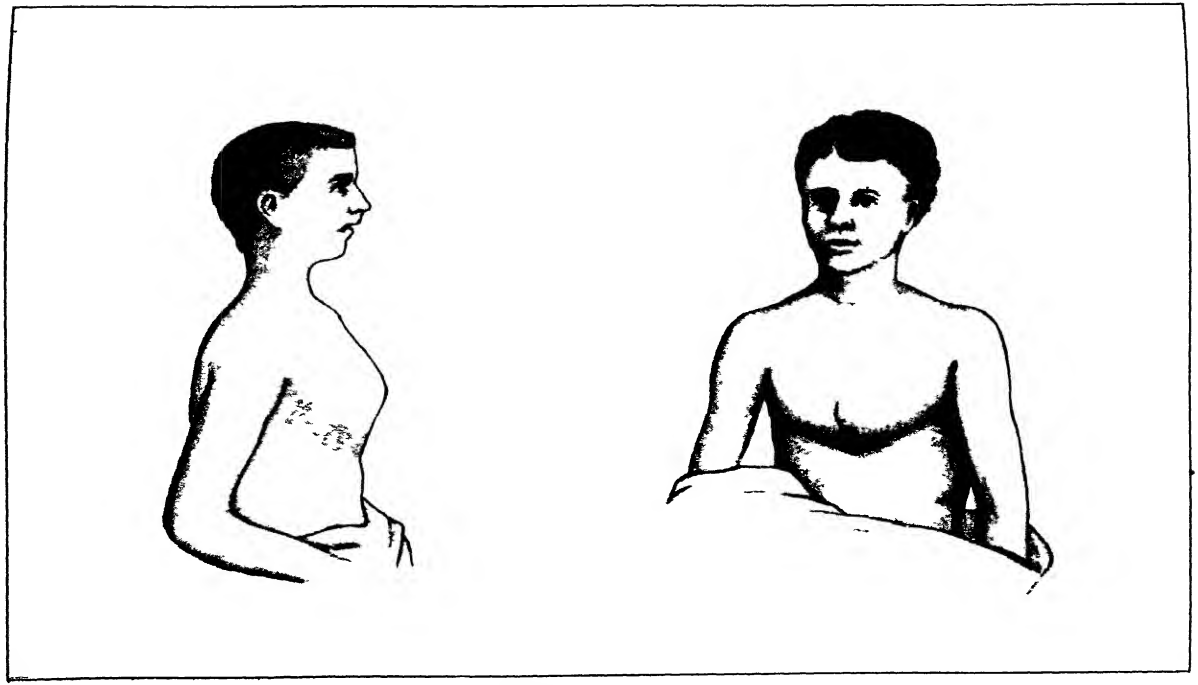
5. Arrange two pulley-weights so that the handles will hang from the ceiling at such a height above the head that they can be just reached by the hands when stretched perpendicularly. Grasp the handles with the palms outward, and lower the arms to horizontal, keeping them well extended. After holding several seconds, return to the original position, and repeat.

6. To increase the depth of the chest, no exercise is superior to the use of the single pulley. Attach a bar to the end of the rope. Grasp this with both hands placed about one foot apart. Draw the bar down from above the head to the chest, and return to position. The weight should be gradually increased until it amounts to one-half the weight of the body. All exercises with the arms enlarge the chest by pulling upon the ribs; but of all exercises described in this chapter, none are of greater importance than those which develop the breathing capacity.

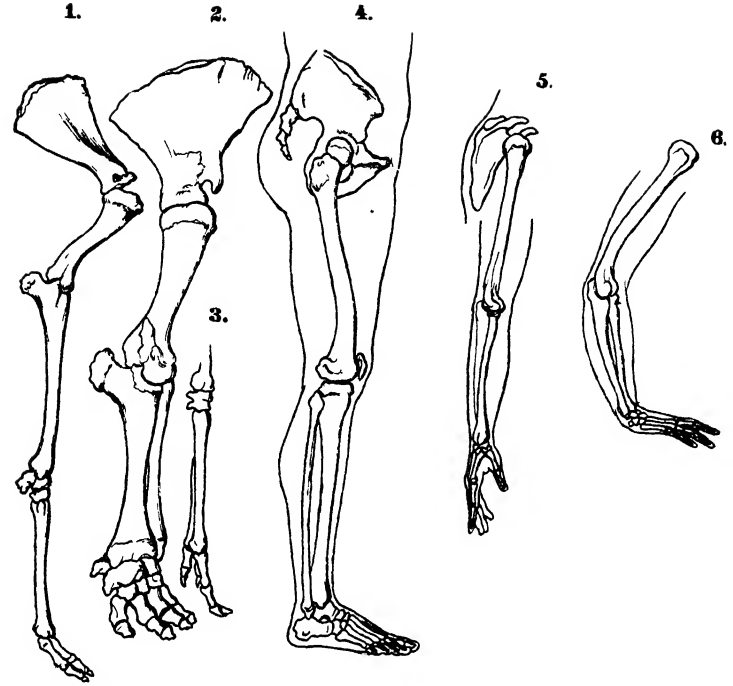
7. Grasp the top of a bedpost with both hands; extend the arms; slide the feet backward about one foot. Now by flexing the arms, while the whole body is held rigid, let the body fall forward until the forehead touches the bedpost. Hold this position while taking a deep breath; extend arms; take another deep breath; then repeat the movement. The exercise may be varied by swaying the body from side to side. This movement strengthens the muscles of the chest, abdomen, and back.

Another exercise admirably calculated to strengthen and expand the chest is the following: Lie down upon the floor in the prone position; bring hands forward up beneath the chest, palms downward; keeping the body rigid, extend the arms so as to raise the body. By alternately flexing and extending the arms, the body may be repeatedly raised up and down. Deep breaths should be taken after each movement, and the lungs should be inflated just before the arms are extended. The vigor of the exercise may be increased by holding the feet rigid, so when the arms are extended, the only portions of the body touching the floor are the toes and the hands, so that the whole weight of the body is sustained upon these parts.

Active exercise also greatly increases the rate of the breathing movements. At first, the breathing is slightly difficult, but after a short time, when the runner has his "second wind," respiration becomes easier, due to the fact that the entire lung surface has been brought into action by the complete distention of every part of the lungs. This fact has in it an important lesson, namely, that in ordinary breathing the entire

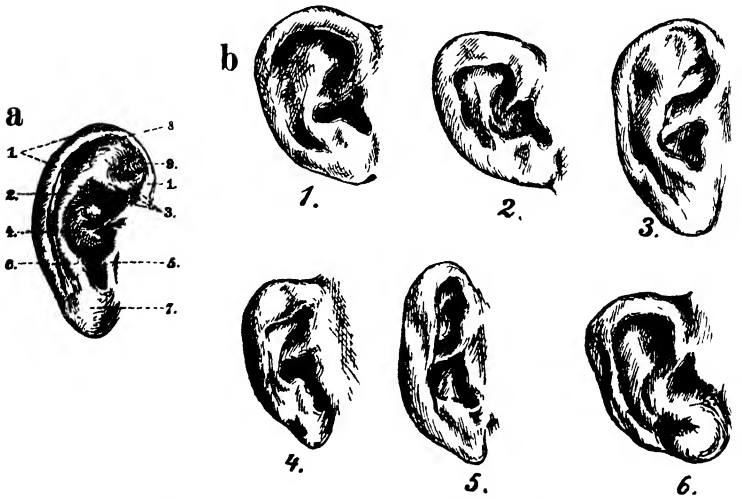


PIGEON BREAST



1 Right Foreleg of Camel 2. Right Foreleg of Elephant. 3. Right Foreleg of Hog
4 Right Leg of Man Right Arm of Man Right Arm in Leg Position.

COMPARATIVE ANATOMY OF THE LEG AND ARM.



a External Ear b, 1 to 6. Normal Ear with Variations.

EARS.

lungs are not brought into use, and hence are likely to become diseased unless brought into full and active movement by taking daily exercises which necessitate deep and full respiration. Such exercises should be taken several times a day.

Running or rapid walking in the open air is the best means of securing the necessary lung capacity. If this is not convenient, however, the same results may be secured by exercise taken indoors with doors and windows widely opened so as to secure free ventilation. It is not even necessary to run about the room. One may "run in place," executing the movements of running by throwing the weight first upon one foot and then upon the other, lifting backward the foot which is not in use. Various other exercises may be employed to excite the lungs, but active movements of the legs are, on the whole, of the greatest service. Very rapid running, carried to the extent of extreme breathlessness, is likely to be injurious to persons who have passed the age of twenty-five years. So-called "sprinting" is injurious to the heart, and in time leads to other injuries. The deep breathing induced by running continues for some time afterward. Those who habitually walk or run much, or who engage in mountain climbing daily or several times weekly, breathe deeper even in sleep than do persons of sedentary habits, and in consequence introduce into their bodies a larger amount of oxygen, and live on a higher plane physically than do others.

To Develop the Legs.—1. The calf of the leg is not much used in ordinary walking, but by keeping the knees well sprung back, and making a little push

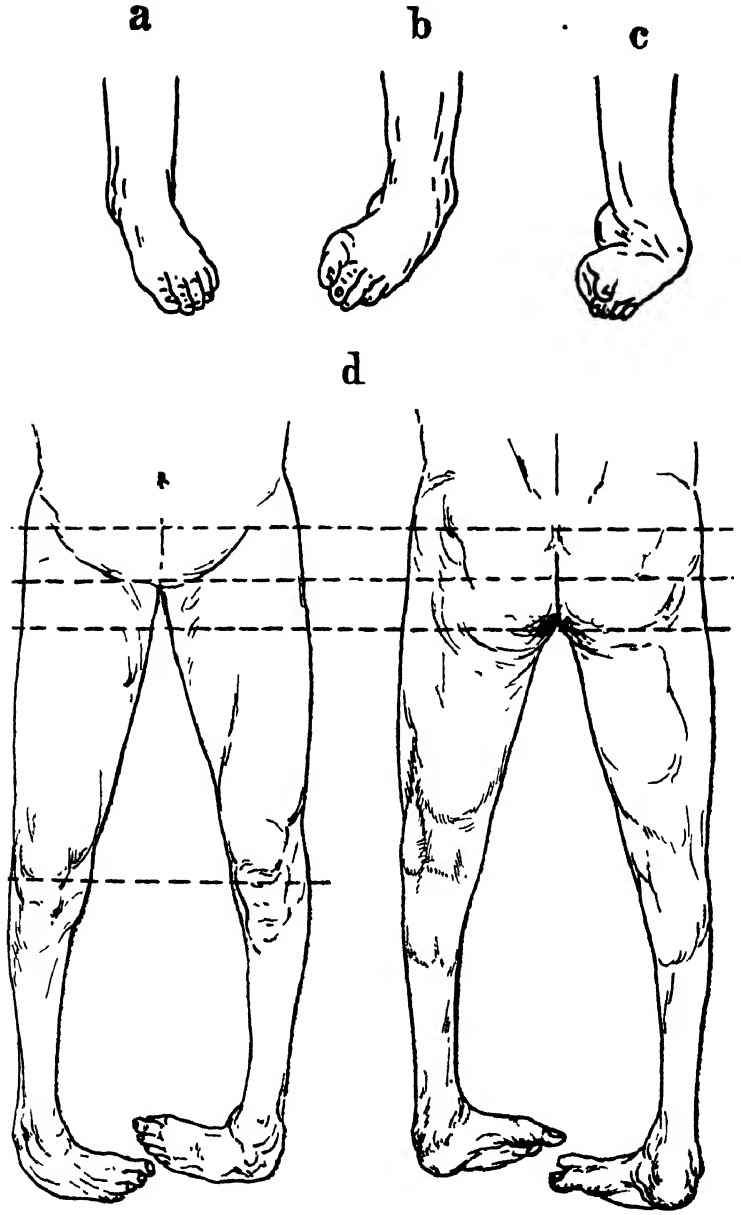
with the rear foot at the same time that the forward foot is being placed in position, which may be termed "push-walking," the calf may be brought into very active and vigorous exercise. Running fast, hopping, jumping, and leaping also bring the muscles of the calf into active exercise.

A simple exercise which brings the muscles of the calf into vigorous exercise consists in rising slowly to a position known as toe-standing, then slowly lowering again and repeating. This movement should be repeated from fifty to five hundred times to secure the proper amount of exercise.

2. The muscles of the front side of the calf are not used in ordinary walking; but in fast walking, walking with the knees well sprung back, in stooping and in balancing, these muscles are powerfully exercised. They are also brought into full play by standing and walking upon the heels. Standing upon the heels and holding weights upon the toes is another means of giving these muscles special work.

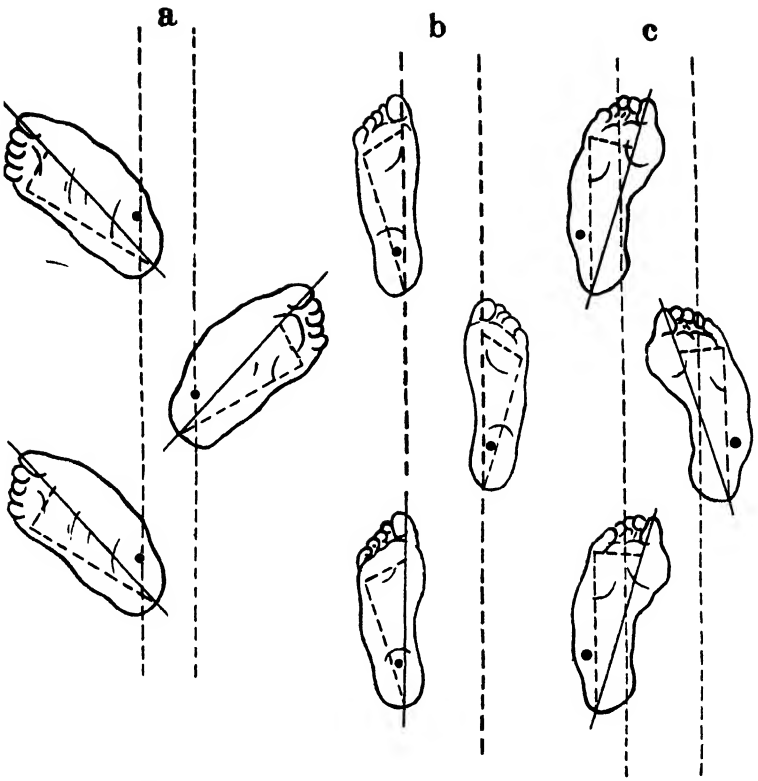
3. The muscles of the front of the thigh are specially exercised in running, jumping, and fast walking. They may be well exercised by standing with the back to the wall, bending up one leg and placing the foot against the wall, and alternately contracting and relaxing the muscles of the bent leg, pushing the body away from the wall, and allowing it to fall back into position.

4. The muscles at the back of the thigh are exercised in push-walking, in bending forward with the knees well sprung back until able to touch the floor with the hand (this is an essential part of what is



a Normal Foot. b, c, and d. Club Feet.

DEFORMITIES OF THE FEET.



a Flat Feet. b. Normal Feet. c. Hollow Feet.

NORMAL AND DEFORMED FEET.

known as the "setting up drill," to which fresh cadets at West Point and other military schools are subjected), and walking with weights attached to the foot, or using the pulley-weights with the foot. In throwing the foot violently forward, as in kicking, these muscles are vigorously exercised.

Exercise for Flat Foot.—Flat foot is probably due in most cases to congenital weakness of the ligaments which support the arch of the foot. The development of this deformity is doubtless encouraged by long standing upon a hard, resisting surface. In very bad cases, this difficulty cannot be cured. The pain occasioned by it may be relieved by the use of a support worn in the shoe. Such an appliance can be obtained through any surgical instrument maker, to whom it will be necessary to send an outline of the foot made by placing the bare foot upon a piece of paper and marking the outline with a pencil. In young persons this defect can be to a very considerable degree remedied by the following simple exercise: Place the feet close together so that they are parallel, toes and heels touching. Firmly holding the feet in this position, rise upon the toes, contracting the muscles of the calf in such a way as to lift the heels from the floor. The heels should be raised as high as possible, and the position should be held while counting eight. Heels may then be allowed to sink. After resting a few seconds, repeat the exercise.

Exercises to Promote General Health and Development.—As before remarked, there is nothing better than labor for promoting muscular development and securing the advantages which come from exercise.

But care should be taken continually to keep as nearly as possible in a correct poise. Ignorance, carelessness, or weariness often leads a person to assume awkward and unhealthful positions while engaged in work, which, in consequence of the irregular muscular development thereby induced, become fixed deformities. It should also be remarked that some employments give undue exercise to special muscles, and this leads to deformities. A carpenter, blacksmith, and cabinetmaker may be generally known from other artisans by the way in which they carry their arms. The strongly developed flexor muscles overbalance the extensors, so that the arms are constantly bent when at rest as well as at work.

For children, out-of-door play, light work, assisting in cultivating small fruits, doing chores, and similar occupations, are the very best kinds of employment. Elderly people require a considerable amount of exercise, but should carefully avoid violent exercise of all sorts. They should especially be careful not to become greatly overtaxed, or not to become greatly out of breath. The chest wall being rigid, the lungs cannot expand as in youth, and the heart may also be easily overworked. Elderly people who are accustomed to exercise do not so quickly experience a sensation of fatigue because of diminished nervous sensibility. They are consequently very liable to overwork, not being aware of the fact until a day or two later, when the symptoms of secondary fatigue appear. It is very important that elderly people should understand this fact, which applies to mental as well as physical work. An elderly man may be able to compete

with a young man in exertion without apparent injury at the time, but will later suffer, while the young man will experience no injury, though at the time greatly exhausted.

Women as a class suffer more than do men in consequence of lack of exercise. Their exercises must be less violent than those of men, as they have but half the muscular strength, and are less accustomed to vigorous muscular exertion. Breathing exercises are especially important for women and aged persons.

Running exercises are not to be recommended for adult women nor for persons past middle age. Boys and girls of twelve to eighteen years of age may run until quite fatigued without injury. Their hearts and lungs are sound, and not easily damaged. Adults, unless from youth accustomed to running, must content themselves with a very slow pace, and should avoid exercising until extreme breathlessness is produced. The pulse and the respiration should return within a few minutes to the normal rate. When the pulse remains quick for half an hour or more after exercising, this fact is evidence that the exercise has been too violent, and must not be repeated until the body has been trained.

Elevation of temperature, as shown by the thermometer, after moderate exercise, as a walk of a mile or two, is a symptom which should receive immediate attention, as it indicates a possible beginning of tuberculosis of the lungs. Exercise should never be taken by a person who has fever. Persons who are just recovering from an attack of typhoid or other acute febrile disease, should begin exercising very carefully

indeed, as there is great danger of producing a relapse. Even sitting up will cause an elevation of temperature in a recent fever convalescent.

The Amount of Exercise Required.—A workingman, as we have learned, may perform work equivalent to lifting nine hundred tons a foot high in a day. It is not probable, however, that so much work as this is required for the maintenance of health; but it has been calculated that at least one-fourth of this amount of labor, or work equivalent to walking nine miles, should be done daily by the average man in order to maintain normal and proper vigor and activity of the lungs and heart, and of the various functions which depend upon the action of muscles. It should be remembered, however, that the strength, health, and vigor of the internal muscles, those of the stomach, intestine, and bladder, as well as those of the heart, depend upon the strength of the external muscles. When the external voluntary muscles are weak, the internal muscles become weak also. There is known to be an association through the nerves of the muscles of the abdomen with those of the stomach, such as accounts for these effects. In the examination of hundreds of patients, the author has observed that those patients who have extremely dilated stomachs have extremely weak abdominal muscles. The maintenance of strong and vigorous external voluntary muscles must then be regarded as directly related to the health of the important organs of the trunk upon which maintenance of life primarily and immediately depends.

Exercise may be classified as gentle, moderate, and violent. Gentle exercise is that which does not pro-

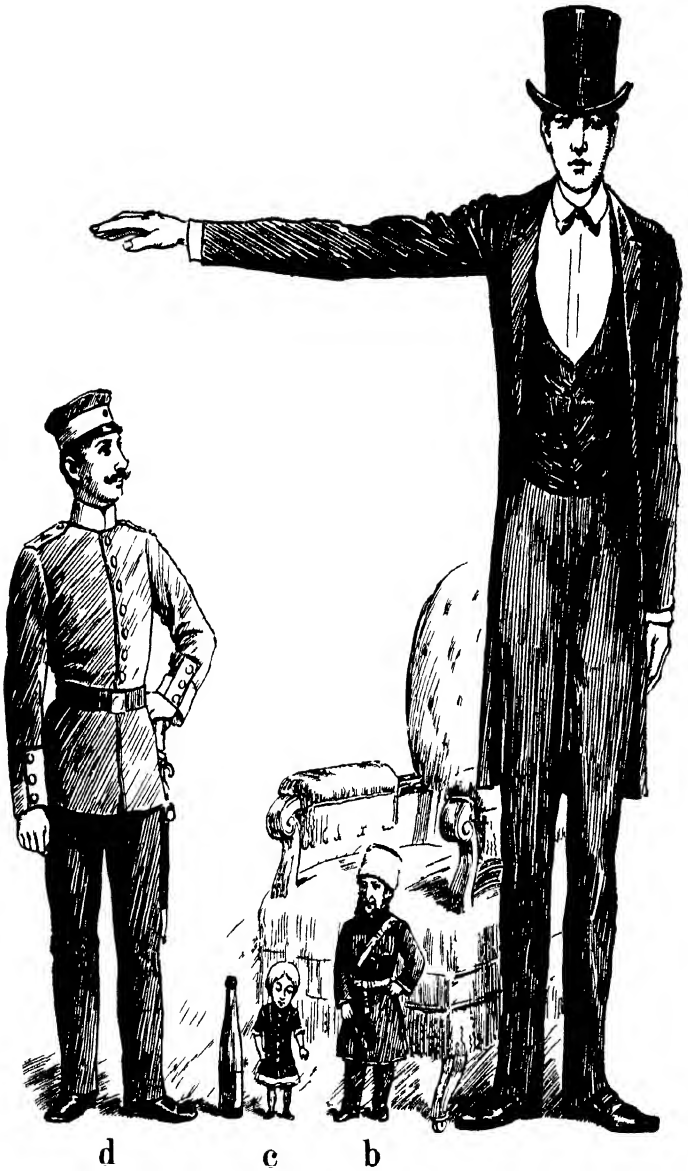
duce either fatigue or breathlessness. Moderate exercise produces fatigue when sufficiently long continued, but not breathlessness. Violent exercise produces breathlessness, which is one form of fatigue; and if continued for any length of time, produces exhaustion. Gentle exercise is adapted to invalids and very feeble persons. Violent exercise is permissible only to young persons and adults who have been accustomed to vigorous exercise all their lives. Moderate exercise is the sort which is especially indicated for health in all classes. It must not be considered, however, that exercises are harmful that cause a person to breathe deeply. Deep breathing is one of the most beneficial effects derived from the exercise.

Estimation of the Work Done in Taking Exercise.—The total amount of work which may be done in a day by an ordinary laboring man is about equal to the lifting of 1,800,000 foot pounds, or lifting nine hundred tons one foot high. This is equivalent to lifting a hundred-ton weight a foot high thirty times a minute during ten hours. A man could not accomplish this with his arms alone, but by employing both his arms and his legs, this enormous amount of work, and even more, may be accomplished. Indeed, the body has such a wonderful capacity for work that it is possible for a strong man to put forth the enormous amount of effort indicated in a fraction of a day by taxing his energies to the utmost in such violent exercise as a rowing contest.

It is sometimes useful to make calculation of the amount of work which one performs in a given exercise. For example, in such a simple exercise as walk-

ing, the amount of work done is much larger than would be supposed. At each step, the body is lifted about 1½ inches. Allowing 2½ feet for each step, 8 steps would cover a distance of 20 feet. In taking these 8 steps, and raising the body 1½ inches at each step, the body would be raised in all just 1 foot. It thus appears that the amount of effort required to walk 20 feet on a level surface at the rate of 3 miles an hour is just the same as would be expended in lifting the body perpendicularly 1 foot. The same amount of work would be accomplished if one should walk 10 feet and at the same time ascend a grade at the rate of 6 inches to 10 feet, or a trifle more than ½ an inch to the foot.

Let us suppose the amount of work which a person is capable of doing in a day is equal to the lifting of 1,800,000 pounds 1 foot high. This is the amount stated by eminent authorities to be the average day's work of which the body is capable. Let us determine how far a person would have to walk in order to perform this work in lifting his body along a horizontal surface. Supposing the weight of the person to be 180 pounds, dividing 1,800,000 pounds by 180, we learn that it would be necessary to lift his own body 10,000 feet in order to do the required amount of work. If the work done in walking 20 feet is equivalent to lifting the body 1 foot, the distance to be traveled to do the required amount of work will be obtained by multiplying 10,000 by 20, which equals 200,000 feet. Dividing this by 5,280, the number of feet in a mile, we have 38 miles as the distance to be traveled. If the journey involved the ascent of a mountain 5,000 feet in height, the required distance would be only one-



a Grant Winkelmaier 8 feet 8 inches high b Abdurrhaman Pascha 25 inches high c Princess Pauline 4½ years old 15 inches high d Average Man 5 feet 8 inches high

GIANT AND DWARFS

half as great, or 19 miles. By similar calculations, it is easy to determine the amount of work done in traveling either on a level or in climbing hills or mountains, provided the distance traveled and the altitude ascended are accurately determined. The amount of work done may be increased, of course, by carrying a burden of any sort. If, for example, a man weighing 180 pounds should carry in addition to his own weight a burden weighing 90 pounds, the distance traveled would be proportionately less (1,800,000 ÷ 270 = 6,666). It is thus apparent that a very fat person will accomplish a larger amount of work in traveling a given distance than a person of less weight.

The body is always at work. The heart and lungs do work amounting to much more than 100 foot tons during 24 hours. The simple acts of sitting or standing require expenditure of energy. Rapid walking may more than double the energy expended in a given time, and in running, the amount of work accomplished may be several times as much as that performed in walking at the rate of 3 miles an hour.

Ordinary slow walking involves very little muscular exertion for a person in ordinary health. When the rate of walking is increased to 5 or 6 miles per hour, the amount of muscular work involved is considerable. Walking at the rate of 3 miles an hour is equivalent to lifting the body perpendicularly through $\frac{1}{20}$ of the distance walked. For example, if a person walks 1 mile at the rate named, the amount of work done would be equivalent to lifting the body perpendicularly through a distance of 264 feet (5,280 ÷ 20

If the distance traveled has been along a

rising surface, the elevation attained must be added to the work done. For example, if a person in traveling a mile has ascended a hill 1,000 feet high, the total amount of work done would be equivalent to lifting the body 1,000 + 264 feet, or 1,264 feet. Suppose the person's weight to be 150 pounds, the amount of work done would be 1,264 × 150, or 189,600 foot pounds, or nearly the same amount of work that would be done by walking 5 miles on a level surface.

If a hill or a mountain is not available, ordinary stairs may be utilized most advantageously. In going upstairs, one is obliged to lift the body through the distance from the lower floor to the floor above. Suppose the distance to be 10 feet, and one's weight to be 170 pounds. Going from the lower story to the upper would involve an amount of work equivalent to lifting a little more than 1 ton a foot high. To do a day's work, that is, to lift 150 tons, the person would have to ascend the stairs about 150 times, taking no account of the small amount of work involved in descending the stairs.

The work can be accomplished, if desired, by means of exercises which can be readily taken in one's own room; as, for example, in such exercises as standing erect and alternately raising and lowering the heels, or flexing and extending the knees, or supporting the body upon the hands between two chairs or other supports, and letting the body down as low as possible, and then raising it to position,—the so-called "dipping" movement. In the last-named exercise the work is done by the arms.

To do the 150 foot tons of work, a man weighing 150 pounds would have to walk 40,000 feet, or about

7½ miles, at the rate of 3 miles per hour ($300{,}000 \div 150 \times 20 = 40{,}000$). The same man practicing heel raising at the rate of 100 movements a minute, for 16 minutes, rising 2 inches each time, would do as much work as in walking a mile ($150 \times \frac{1}{6} \times 16 \times 100 = 40{,}000$).

He would have to continue the exercise for 2 hours to lift his 150 foot tons. As this would make the legs do all the work, it would be better to divide the work between the arms and the legs. This may be accomplished by making the arms assist, by resting the hands upon the back of two chairs, the foot of the bed, a table, or any other convenient support, and making a downward push with the arms each time the heels are raised.

A larger amount of work may be done in the same time by lifting a pair of iron dumb-bells with the arms at the same time the heel-raising movements are executed. For example, a person weighing 150 pounds, holding in his hands a pair of dumb-bells weighing 25 pounds each, making the total weight lifted 200 pounds, raising himself 2 inches 30 times a minute, would do work amounting to 1,000 foot pounds each minute, or 60,000 foot pounds in an hour.

If at each movement a pair of dumb-bells weighing 10 pounds each are raised 1 foot, the additional work thus done would amount to 21,600 foot pounds for the hands. The combined work of the arms and legs would be 39 foot pounds for each movement ($162 \div 6 + 12 = 39$). It is only necessary to divide the total work to be done, 300,000 foot pounds, by 39 to determine the number of times the movement must be executed ($300{,}000 \div 39 = 7{,}700$). At the rate of 20 movements

a minute, the work could be done in a little less than 6½ hours.

By combining knee-flexing movements with the arm-flexing movements and the heel-raising movements, the required work can be accomplished in a shorter time, although the greater length of time required for the execution of the movement lessens the advantage. For example, a person weighing 150 pounds, first raising his heels, then bending his knees, and returning to position, raising and lowering his body about 14 inches in so doing, would perform work equivalent to lifting his entire body 1 foot in the same length of time. Executing these movements at the rate of 16 times a minute for 2 hours and 5 minutes, would be equivalent to walking 8 miles, or a day's work of 150 foot tons, for a person weighing 150 pounds.

Fatigue.— When any large group of muscles—for example, those of the legs — is set in active operation, as in jumping or running, one becomes very quickly out of breath. This is a species of fatigue. It is due to the fact that when the muscle is at work, it throws into the blood which passes through it a large quantity of carbonic acid gas, which is poison to the body, and must be hastened out through the lungs. The greater the amount of this gas thrown into the blood, the quicker one becomes out of breath, and the more rapid and urgent the breathing movements. Under the influence of active exercise, the lungs are expanded to their utmost capacity by strong chest movements, which are made without voluntary effort, for the process of breathing is under the control of the higher will. The breathing movements induced by vigorous

exercise are deeper than those that can be induced in any other way, because they are executed in obedience to an imperative command from the nerve centers through which the automatic will controls the lungs.

If the exercise is less violent and continued for a longer time, one may not get out of breath, but after a while the muscles will become wearied, so that movement is difficult, and may become impossible. This fatigue, or exhaustion, is due, not to the using up of the supply of energy with which the muscles are stored, but to the production of certain poisonous substances which result from the muscle work, and which have the effect to paralyze the muscle. If one rests for a time, the sensation of fatigue will disappear, the fatigue poisons having been washed out by the blood. The fatiguing exercise may now be repeated.

Secondary Fatigue.—After very prolonged and violent exercise, especially exercise to which one has not been accustomed, one may find himself suffering from muscular soreness, stiffness, together perhaps with great lassitude, and even fever, if the exercise has been very violent or prolonged. These symptoms do not generally appear until some hours, perhaps a day or even longer, after the exercise producing them. This is known as secondary fatigue.

The fatigue induced by a short period of exercise is very quickly recovered from, possibly disappearing within a few minutes. The longer and the more arduous the work performed, the longer the period of rest required for recuperation. Exertion may be carried to such a point that death may result from the fatigue induced. Runners have sometimes dropped dead at the end of

a long course. Horses have been known to die suddenly from the same cause, also dogs when attempting to follow their master on a long and fast bicycle ride. Carrier pigeons not infrequently fall to the ground dead from exhaustion after a long and rapid flight. In such a case death is due to the rapid accumulation of the fatigue poisons formed by the overacting muscles. Fatigue may be said to be always a condition of poisoning, whether it be local or general fatigue.

It is interesting to note that exercise of a portion of the muscles may give rise to general fatigue. For example, one's arms become tired as the result of running, although not to any extent actually employed in the exercise.

The brain and nerves are also wearied as well as the muscles by prolonged muscular work. It is important to note the fact that one is more likely to become fatigued when performing exercise to which he is not accustomed. When he becomes used to the work, it can be done with less fatigue, or perhaps none at all, and the smaller amount of carbonic acid gas produced shows that the work done by the muscle is less.

Mental work requires much less food than does physical labor. Recent careful experiments which have been made, show that men engaged in active mental labor and abstaining from muscular exertion, require practically no more food than men at rest. This is a fact of very great importance for students, ministers, and other professional men whose occupation does not require any considerable amount of effort, since the taking of food in excess of that which is required results in the filling of the blood with poisons,

and in consequence crowding of the tissues with tissue wastes and poisonous matters which interfere with all the bodily functions, and especially with the functions of the brain and nerves. Mental activity is clouded, sleep may be prevented, and all the effects of nervous exhaustion produced by a comparatively slight expenditure of energy, giving rise to languor, sometimes depression, and at other times irritability, confusion, and indecision of mind, even moroseness and melancholy.

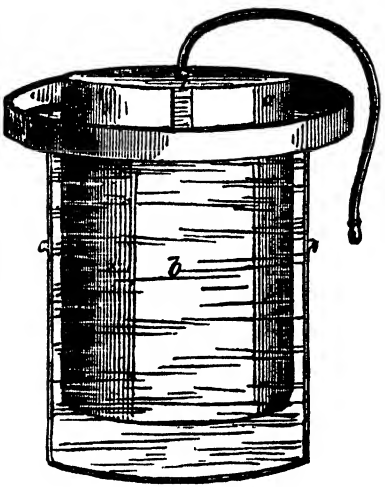
The condition of lethargy produced by excessive eating or habitual drunkenness must be distinguished from fatigue due to work. Persons in this condition often decline to exercise because they "feel so tired." This state of lassitude and enervation cannot be overcome by rest. Carefully graduated exercises and regulation of the dietary are the proper remedies. There are many chronic invalids whose sufferings and disability are wholly due to this cause, and who may be readily restored to usefulness by a spare and simple dietary, combined with outdoor exercises, gradually increased in vigor and duration as the strength improves.

Persons whose habits are sedentary are very much subject to secondary fatigue. As we have already learned, one-fourth of the food eaten, or two thousand five hundred food units, should be consumed by muscular work. A sedentary person consumes in work only one-tenth part of the food eaten, or eight hundred food units, leaving the remainder to accumulate in the body in the form of unused material, provided the same amount of food is eaten. This would give rise to an accumulation of fat at the rate of about one pound a week; but after a time the limit of useful fat accumu-

and divide the muscles of the body into five groups—those of the legs, arms, trunk, chest, and back.

It is interesting to note something of the relative strength of these several regions of the body. The strength of the legs is almost exactly one-half that of the entire body, and twice that of the arms; so the strength of the arms is about one-fourth that of the whole body. The combined strength of the trunk and the chest equals that of the arms. The strength of the average woman is about one-half that of the average man.

Vital Capacity.—By this is meant the number of cubic inches of air which can be exhaled after a deep inspiration. This has been found to have a direct relation to the height of an individual. A person who is five feet and one inch in height, has a vital capacity of 175 inches. Each additional inch in height adds eight inches in vital capacity. Thus, a person measuring five feet eight inches in height should have a vital capacity of 230 cubic inches. The lung capacity is easily measured by means of a spirometer.



SPIROMETER.

An instrument of this sort, shown in the accompanying cut, and which will answer a very good purpose, may be made as follows:

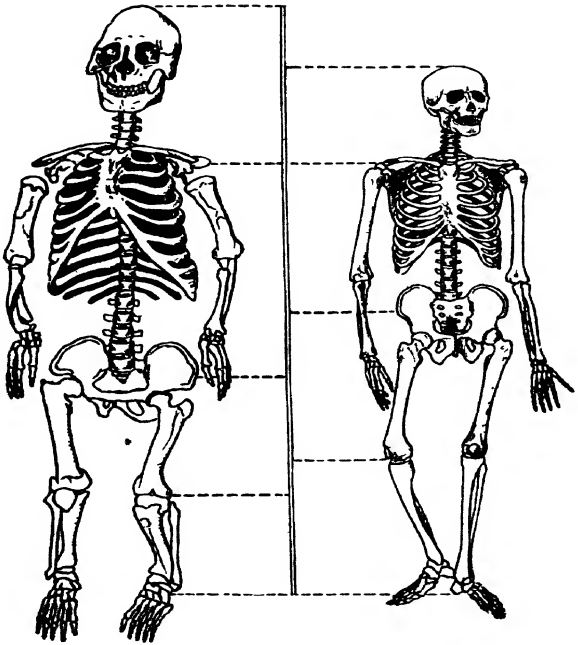


Fig. 1.
Dwarf.

Fig. 2.
Well-Proportioned Man.

a

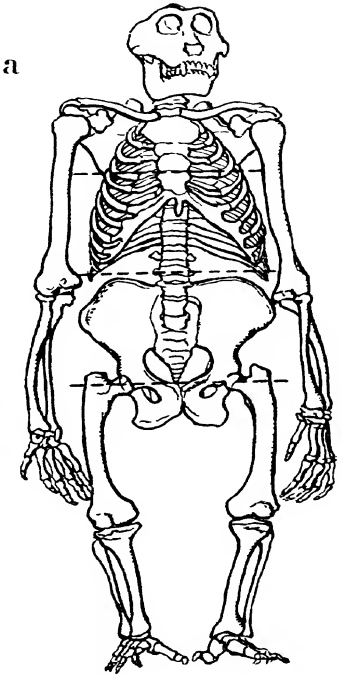


Fig. 3.
Gorilla.

b

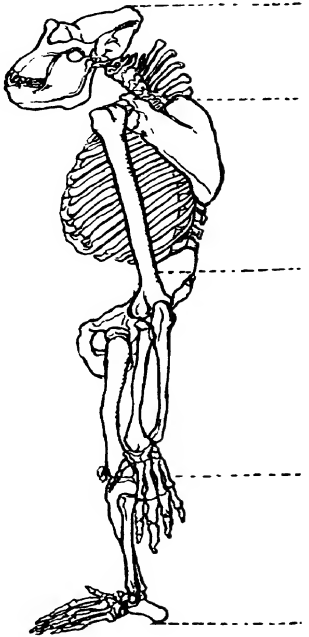


Fig. 4.
Gorilla—side view

COMPARATIVE ANATOMY (All ¼ Natural Size

The instrument consists of two tin vessels, one inverted inside the other. The larger one should be nearly filled with water, and should have a small tube passing up through the center nearly to the top. This should communicate with a flexible tube outside, to the end of which is attached a mouthpiece, which may consist of a short glass tube with a good-sized bore. By blowing into the tube, the inner vessel will be made to rise, and the amount of air expelled will be indicated by a scale accurately determined by previous calculation or experiment, and marked on the outside. If the inner vessel is eight inches in diameter, a scale may be made with lines one-tenth of an inch apart, each of which will represent five cubic inches of air.

A person five feet high ought to be able to raise the scale three inches and a half, after taking a full inspiration. A person six feet high should be able to raise it five inches.

By the daily practice of the exercises described in the chapter on exercises, a person may increase his vital capacity very greatly.

When a person is exhausted from sedentary employment, the practice of deep and prolonged respiration, with the chest well expanded, the shoulders back, and the spine erect, will be found exceedingly refreshing.

Development of the Body.—A vigorous and symmetrical development is something worthy of the ambition of every man; and it is worth while to know that while all cannot become athletes, every man may greatly improve his physique by proper daily exercise.

The following table represents, according to Maclaren, the proportions of the average healthy young man of nineteen, who has never had any special gymnastic training:

Height	5 feet, 8¼ inches.
Weight	133 pounds.
Chest measurement	33 inches.
Forearm measurement	10 inches.
Upper-arm measurement	10¾ inches.

All of these measurements may be considerably increased by a few months' training. The height may be increased from half an inch to two inches; the weight, from five to sixteen pounds; the chest measurement, one to five inches; the forearm, one-fourth of an inch to one and a quarter inches; the upper arm, from one-half an inch to two inches.

Measuring the Body.—Before beginning a course of training, careful measurements of the body should be taken, so as to form a basis for comparison with subsequent measurements, and thus to determine the rate of improvement. These measurements should be made as follows:

The Height.—Stand with the back to the wall, the heels, hips, shoulders, and head touching it, the knees well braced back, the shoulders square, and the chin up. The measurement should be made each time at the same time of day, and after the same amount of exercise, as a very noticeable difference will be found between measurements taken at night and morning, or before and after taking severe exercise.

The Weight.—The body should be weighed each time in the same clothing and at the same time of day. The best time is in the morning, and before any food or fluid has been taken. Care must be taken to avoid any circumstances that may influence the accuracy of the observation.

The Chest.—Stand with the arms extended horizontally, and have an assistant take the measurement with a tape passed around the chest in the line of the nipple. Two measurements should be made, one with the chest empty of air, and the other after a full inspiration.

The Upper Arm.—Close the hand tightly, and bend the arm at the elbow, bringing the hand down near to the shoulder. Measure at the thickest part of the arm.

The Forearm.—Extend the arm, and close the hand tightly. Measure at the thickest part of the forearm. The difference between the upper arm and the forearm is usually one and a half to two inches. When the upper arm is weak, the chest is usually weak also.

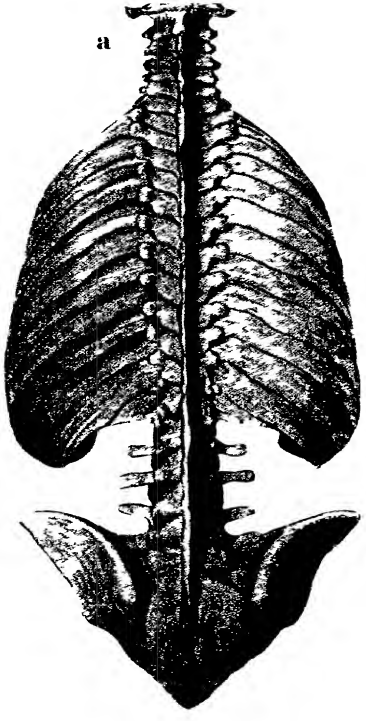
The Thigh.—Stand upon tiptoe, the knees well braced back and the toes pressed down against the floor as hard as possible. Measure as high as possible in a horizontal line.

The Calf.—Stand as for the preceding measurement, and pass the tape around the thickest part of the lower leg.

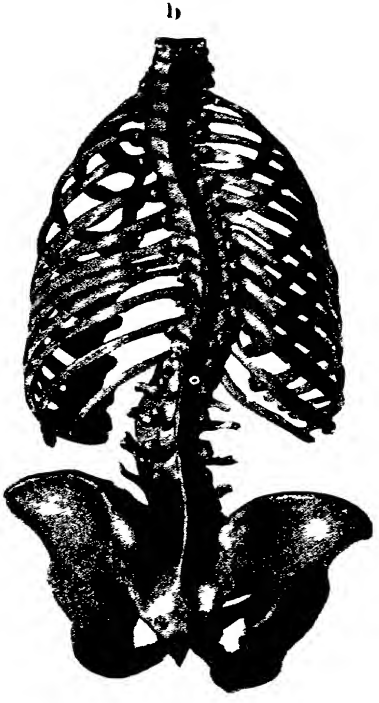
To Correct Deformities in Development.—Many deformities in development, such as round shoulders, curvatures of the spine, hollow chest, stoop shoulders, etc., may be corrected by the employment of the appro-

priate exercises. Lateral curvatures of the spine cause one shoulder to be lower than the other. The cause is weakness of the muscles of the back upon one side. The shoulder of the weaker side is higher than the other. This side should be exercised more than the other. In using dumb-bells or Indian clubs, the arm of the weaker side should use the heavier bell or club. The same principle applies to the use of pulley-weights and other exercises.

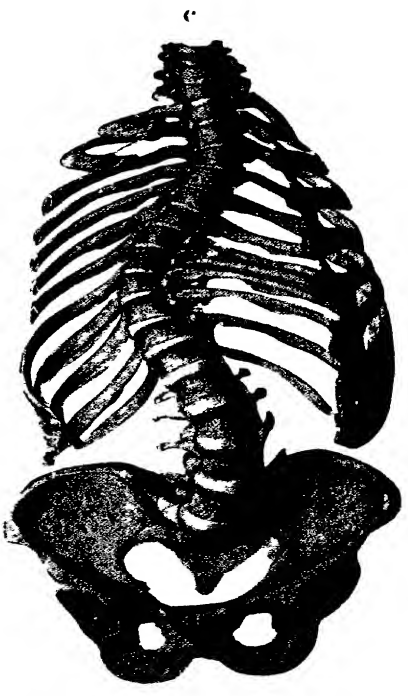
Dumb-bell and Indian-club exercises, hanging by the hands, and the use of the pulley-weights with the back to the weights, are all excellent means of correcting hollowness of the chest and stoop shoulders.



Normal Spine



Lateral Curvature



Lateral Curvature, Front View

THE RELIGION OF THE BODY

THE essence of morality is right doing, or the practical recognition of the obligation to law. Man is a part of the great universe, and is as much under the domain of law as the planets, rocks, trees, and other natural objects, or as the pebble, which, when thrown in the air, falls to the ground in obedience to the law of gravitation. Destructive agents of every description affect man as readily as though he were of no greater value than a senseless rock or a decaying log.

In addition to the general laws which relate to all natural objects, and to which man is subject in common with all other objects, man is governed by various special laws which relate to his physical, mental, and moral welfare. For example, his digestive apparatus, from its very nature, is able to work well and easily and effectively under certain conditions; while under others its activity is imperfect and inefficient. In other words, there are certain laws which relate to digestion, the infringement of which is visited by the penalty—indigestion. So, also, certain laws regulate the activity of the muscles, the lungs, the heart —every portion of that delicately contrived machine which we call the body. It is also evident that the mind, which is intimately related to the brain, acts in accordance with certain well-defined laws; and a

failure to observe this fact often results in serious and sometimes irreparable injury. If it were not for the penalties which nature has attached to the violation of her laws, man would often abuse his body in the most gross and shameless manner, wholly perverting its functions and objects from the original intention of his Creator.

Pain a Blessing.—When we violate a physical law, nature warns us that we must cease wrong doing, and mend our ways. If we might thrust any portion of the body into a fire without being burned, how long would we be likely to escape serious injury from this destructive agent, as the result either of neglect or carelessness? If we heed the first hints of warning nature gives us, we may be protected from the grave injuries which often result from neglecting her warnings; but if we ignore the friendly warning of danger which nature gives whenever we go astray from the path of physical rectitude, in the form of pain, discomfort, or other unpleasant symptoms, nature after a time ceases to enter protest against the abuse to which she is subjected, leaving the body practically defenseless against the enemies of life and health with which it is surrounded.

Moral Law. — The moral nature, as well as the physical and mental, is also subject to various laws, the observance of which is necessary for its well-being. What these laws are, we need not stop to define, as they are epitomized in the most faultless manner in that wonderful crystallization of all moral principles and precepts, the Divine Decalogue. Though graven in stone by the finger of the Almighty at Sinai,

these rules for the moral direction of human beings were not there created, but, like those laws which relate to man's physical organism, were the outgrowth of his moral nature, the necessary consequence of the relations established between man and his fellow man by the fiat of the Creator which brought him into existence. The violation of one of these moral principles must as certainly result in injury to the transgressor, as the violation of those laws which relate to his digestion, or to the activity of any of his bodily organs.

The idea that the Almighty made man, and then laid down certain arbitrary rules by which his moral acts should be governed, is a mistaken one. The dire consequences of sin are as much the result of the infraction of the principles which are the natural outgrowth of man's moral constitution, as the pain which follows the exposure of the flesh to mechanical violence, or the action of a chemical agent, is the result of the violation of those laws which relate to his physical constitution, and which govern the relations of his body to external things.

Those who find fault with the Almighty for making men subject to pain and suffering, physically, mentally, and morally, would do well to consider for a moment what would be the consequence if all penalties for wrong doing were abrogated. The patient, groaning with distress, looks upon pain as a calamity which he would gladly escape from if possible. The wise physician recognizes pain as one of man's best friends, since it warns him of his danger when pleasure or fancy allures him from the straight road of physical rectitude. So, also, the moral physician looks upon

the penalties of moral transgression, not as calamities, but as monitors, deprived of the influence of which, most human beings would quickly lose themselves in the mazes of moral turpitude.

Morality is generally looked upon as relating solely to those relations which are directly embraced in the injunctions of the ten commandments; but the view which regards man as a natural object, governed only by natural laws, and which defines right doing as being simply obedience to law, gives to the term *morality* an immensely broader scope, and makes it include all those laws and principles by which his entire being is governed.

This notion of morality is confessedly a modern one, or rather a revival of a primitive idea which was hidden so deep in the mental and moral darkness of the Middle Ages that it has only in modern times begun to reach the light. Less than a thousand years ago, physical and moral uprightness were supposed to be so far dissevered as to be actually antagonistic; and, indeed, it is asserted that the idea that the degree of a person's holiness was to some extent proportionate to his lack of cleanliness, was once so prevalent among a certain class of religionists that to be extremely filthy in habits was considered more creditable than to be scrupulously neat.

Bogus Religion.—According to a recognized authority, St. Ignatius was accustomed to appear abroad "with old, dirty shoes. He never used a comb, but allowed his hair to clot, and religiously abstained from paring his nails. One saint attained to such piety as to have nearly three hundred patches on his breeches,

which, after his death, were hung up in public as an incentive to imitation. St. Francis discovered by certain experience that the devils were frightened away by such kind of breeches, but were animated by clean clothing to tempt and seduce the wearers; and one of their heroes declares that the purest souls are in the dirtiest bodies. Brother Juniper was a gentleman perfectly pious on this principle; indeed, so great was his merit in this species of mortification, that a brother declared that he could always nose Brother Juniper within a mile of the monastery, provided the wind was at the due point. Many stories are told of lions and other fierce beasts of prey rushing upon such holy men in the desert, but suddenly stopping in their career, and flying away with every sign of fear and terror; which may well be credited, the 'odor of sanctity' being too much for the olfactory nerves of a lion."

Genuine Religion.—A genuine morality is broad enough to take in the whole man, and demand self-respect, and obedience to all the laws relating to his welfare. This is genuine religion, pure and undefiled. The religion of Socrates, while embodying many and most excellent moral precepts, still gave license for the free gratification of the animal instincts, and ignored to a large degree the moral obligation to care for and discipline the body. The religion of Buddha, while stimulating its disciples to a high degree of self-control and self-abnegation, ignored the poor body as worthy but to be sacrificed or tormented, as a possible means of improving the soul. The religion of Mohammed, while imposing many sanitary obligations, pictures a heaven teeming with sensual pleasures. No-

where else but in enlightened Christianity is there to be found a religion broad enough to embrace a whole human being, an entire humanity.

Religion includes something more than simply morality. It includes not only belief in a higher Power, and in personal and individual obligations to the same, but a recognition of an individual dependence upon the higher Intelligence, and faith in His ability and readiness to afford aid and succor in times of need and distress. One of the most unhappy tendencies of the times is the growing disposition to skepticism, which is apparent to every one. Too often the young, dazzled by the achievements of science, and perplexed by the apparent discrepancies between natural and revealed truth, are led to reject the simple revelation of inspiration, and to exalt beyond their real importance the dicta of men of science. Others are beguiled by the wily but blasphemous sophistries of Ingersoll and his followers. A few years ago, at a public meeting in London, at which an eminent American statesman was present, some of the speakers of the evening took occasion to sneer at religion, saying that they could get along without it, and depreciated its influence upon men. The admirable reply of the American was so effectual an answer to the arguments urged by those skeptics, that we take pleasure in quoting it as follows:

An American Statesman on Skepticism.—"I do not think it safe. I am formulating no creed of my own; I have always been a liberal thinker, and have, therefore, allowed others, who differed from me, to think also as they liked; but at the same time I fear

that when we indulge ourselves in the amusement of going without a religion, we are not, perhaps, aware how much we are sustained at present by an enormous mass, all about us, of religious feeling and religious conviction; so that, whatever it may be safe for us to think,—for us who have had great advantages, and have been brought up in such a way that a certain moral direction has been given to our character,—I do not know what would become of the less favored classes of mankind if they undertook to play the same game. I wish only to enter the protest of one in whose veins runs the blood of Calvinistic ancestors, against the way in which Calvinism has been spoken of, and also to remind one of the speakers that the saint whom he quoted was the same who said, 'The greatest of these is charity.' Whatever defects and imperfections may attach to a few points of the doctrinal system of Calvin,—the bulk of which was simply what all Christians believe,—it will be found that Calvinism, or any other ism which claims an open Bible and proclaims a crucified and risen Christ, is infinitely preferable to any form of polite and polished skepticism, which gathers as its votaries the degenerate sons of heroic ancestors, who, having been trained in a society and educated in schools, the foundations of which were laid by men of faith and piety, now turn and kick down the ladder by which they have climbed up, and persuade men to live without God, and leave them to die without hope. The worst kind of religion is no religion at all; and these men, living in ease and luxury, indulging themselves in the 'amusement of going without religion,' may be thankful that they live in lands

where the gospel they neglect has tamed the beastliness and ferocity of the men who, but for Christianity, might long ago have eaten their carcasses like the South Sea Islanders, or cut off their heads and tanned their hides, like the monsters of the French Revolution.

"When the microscopic search of skepticism, which has hunted the heavens and sounded the seas to disprove the existence of a Creator, has turned its attention to human society, and has found a place on this planet ten miles square where a decent man can live in decency, comfort, and security, supporting and educating his children unspoiled and unpolluted; a place where age is reverenced, infancy protected, manhood respected, womanhood honored, and human life held in due regard,—when skeptics can find such a place ten miles square on this globe, where the gospel of Christ has not gone and cleared the way, and laid the foundations, and made decency and security possible, it will then be in order for the skeptical *literati* to move thither, and there ventilate their views. But so long as these very men are dependent upon the religion which they discard for every privilege they enjoy, they may well hesitate a little before they seek to rob the Christian of his hope and humanity of its faith in that Saviour who alone has given to man that hope of eternal life which makes life tolerable and society possible, and robs death of its terrors and the grave of its gloom."

Skepticism Not Safe.—The statesman well remarked, "I think it not safe," referring to the position held by the skeptics to whom he was replying. Is skepticism safe for any one? Is it safe for a young

man starting out to fight the battles of life? Can he afford to get along without the aid of a religion which can do him no possible harm, and which has evidently been a prop and a stay to thousands, and a source of comfort of inestimable value? Think for a moment, young man, what will be your condition if in the end it should prove that your unbelief was a delusion, and that in rejecting the claims of Christianity and religion, you have rejected the only means by which you can be rescued from the thraldom of sin, and secure participation in a life beyond the grave. Suppose, on the other hand, it should prove that the Christian is mistaken. What harm can come to him? His religion has been all his life a comfort to him, and he has lived a better life, a purer life, and really a more successful life than he could have lived without it. If there is no life beyond the grave, he has lost nothing by his belief in it. The risk is all on one side.

Neglecting all considerations but those pertaining to the present life, is it not evident that every young man who would make a true success of life, needs, first of all, the guiding, strengthening, subduing, and controlling influence of religion? Man is a curious compound. He has in him qualities which ally him to the divine and pure beings of another world, linked with gross animal qualities which he shares in common with the brutes. In other words, every man has within him a beast, with appetites and passions which clamor for gratification. A good part of the battle of life, with a man who fights truly and manfully, is to subdue the beast within him, which, when once it rises to the mastery, seizes upon the intelligence, smothers the moral

faculties, and makes of the man, once an image of his divine Creator, a veritable fiend, more grossly brutish than the most savage beast that prowls the earth. With a nature full of inherited tendencies to vice and grossness, surrounded by temptations and incitements to evil on every hand, how can a man, even though his impulses may be good, contend single-handed against such fearful odds? Religion affords a means by which the beasts of appetite and passion may be subdued and chained—yea, even slain; and most unwise is he who, in his vain self-sufficiency, rejects this most essential of all aids, religion.

Influence of Habit.—The brain and nerves are so curiously fashioned that any act repeated many times comes at last to be performed with such ease and readiness that it is done with little or no voluntary effort. Such an act is said to be habitual, and may in time come to be performed quite unconsciously. In the formation of habits, the structure of the brain is actually modified in such a way as to enable certain acts to be performed much more easily than others. This explains why it is so difficult for habits to be broken, and why it sometimes seems absolutely impossible for the unfortunate victim of some wretched vice to free himself from a thing which, in his better moments, he thoroughly abhors. For such as these, particularly, religion affords a means of aid invaluable. But even with all the aids to be afforded by this and every other means, the battle for victory over habits long indulged is sometimes a most terrific one. Hence, the importance of forming in early youth such habits as will not need to be broken. The world is full of people whose use-

fulness is nearly or quite destroyed by unfortunate habits contracted during youth. Let the young man who aspires to a noble and useful manhood watch carefully over himself during his early years, when the foundations of his character, which will influence his whole life, are being laid.

Ethics of Health Caring.—"But," says a young man who recognizes the importance of holding fast to the principles of morality, as related to other matters, "is it anybody's business what I eat or drink or wear, or how I use my body? Do not I belong to myself? and haven't I a right to do as I please with myself?" These and similar remarks are very frequently made to those who urge the moral obligation of health culture, and apparently in full sincerity on the part of those who make them, and with entire confidence that they are offering an unanswerable argument in support of their personal rights to do as they please respecting their own bodies, whether their actions are in harmony with the laws of health or not.

Let us see how much truth there is in the claim that individual rights include the right to treat the body in a manner not consistent with its interests—to abuse the stomach for the purpose of affording the palate a questionable gratification; to whip and goad the brain and nerves by stimulants to do more work than is possible for them to do without injury; to recklessly violate any or all of the laws of health.

Individual Rights.—The claim is not that disregard of the laws of health does not injure the body, but that a man has a right to abuse his body if chooses. Let us see. Here is a man who has

possessions,—houses, barns, well-filled granaries, collections of rare and curious natural objects, galleries filled with beautiful works of art, safes filled with paying stocks and government securities,—all sorts of wealth. Suppose this man takes it into his head to destroy this wealth. Possessed by this idea, he sets fire to his houses and barns and granaries, and into the flames hurls the contents of his costly collections; deliberately enters his art galleries, and demolishes the masterpieces of great artists which adorn the walls; opens the doors of his safes and vaults, and one by one commits his treasures to the flames. Hold on there! says the Law, and its strong hand is laid upon him as soon as his purpose is discovered. A man who thus recklessly destroys his property is regarded as either a criminal or a lunatic, and, in either case, unfit to be at large. The State recognizes the fact that the man's property is not wholly his own, or at least that others have interests in it. What he does not require for his own use belongs to his children or other surviving relatives; or, in case he dies without a will and without heirs, to the State.

The State recognizes the right of a child to inherit from his father his due share of the property which the latter may have acquired. Ought not intelligent men and women to recognize the fact that the child has an even greater right to inherit from its parents a constitution unimpaired by vicious or injurious habits or neglect of the requirements of physical law? What can any parent possess which the child may inherit, that can be estimated as of greater value than a sound constitution, and vitality unimpaired by disease in-

duced by excesses or by disregard of the wants of the body? If the rights of a child to inherit a fair share of the material wealth of its parents are considered worthy of respect and attention, are not its rights to inherit a sound and healthy body equally worthy of consideration?

Human Omnibuses.—The man who injures his constitution by reckless disregard of health laws, not only impairs his own usefulness and real happiness, shortening his life, and bringing upon himself disease in various forms with all its attendant sufferings and inconveniences, but entails upon his children and his children's children, as well as all succeeding generations, the same diseases or tendencies thereto, and the same curtailment of life and happiness which he himself suffers. Indeed, the results of his follies may be felt even more keenly by his children and grandchildren than by himself. That quaint philosopher, Dr. Oliver Wendell Holmes, remarks that each one of us is an omnibus, in which ride all our ancestors. What right has any man by reckless habits of life to compel each of his children to carry about in his "omnibus" the results of the selfish gratification of depraved tastes and morbid appetites?

A Live Picture Gallery.—It may be said, and there is no exaggeration in the figure, that each man is a picture gallery, in which hangs the portrait of each of his predecessors; and among the pictures which hang upon the walls, may be seen some brilliant with beauty, others hideous with deformity; some beaming with health and vigor, others scarred and wasted by disease. Let every man who thinks he has a right to

treat his body as he pleases, consider for a moment the fact that his portrait may sometime hang in somebody's picture gallery, drawn true to nature by an artist who never glosses over defects, or embellishes deficiencies. It is a matter of no small consequence to the owner of said gallery whether the picture which hangs there represents disease and decrepitude, or vigorous vitality.

In the grand palace of an Eastern prince stands the masterpiece of one of the greatest sculptors that ever lived. The grace and symmetry of form and pose give to the white marble a startling appearance of life. The delicate beauty of the artist's conception, and the accuracy of the execution, are beyond description. A reckless vandal sees the treasure, and deliberately proceeds to deface it, until no trace of its former beauty exists. We look upon such an act with horror akin to that excited by murder or sacrilege. The human body is the masterpiece of the divine Architect. How dare any man say he may deface and destroy it if he choose!

The highest type of morality requires obedience to all laws, ready recognition of and acquiescence in their requirements, and sturdy adherence to the right because it is right. The highest type of Christian will include in his creed the religion of the body as well as that of the mind and heart, and should accept for his rule of action a decalogue which recognizes every law essential to the physical and mental as well as the moral welfare of a human being.

Mind and Body. — Another consideration, which certainly is worthy of the thought of every young man,

is the fact that the brain which does his thinking is a part of his body, and that whatever seriously affects his physical health, whatever lowers nerve or vital tone, directly affects, in a harmful way, his mind. The man whose vital tone is lowered by sedentary occupation, by dissipation, by any means which overtaxes or exhausts the nervous system, is in a condition of lowered nerve tone, which means lowered brain tone, lowered mental tone, and *lowered moral* tone. In such a condition of the body, acts which under other circumstances would be looked upon with horror, lose their ghastly loathsomeness, and may at first be tolerated—afterward indulged. A man who is worn out and exhausted physically cannot possibly appreciate with proper clearness and acuteness the bearing and relations of moral principles, as he can when refreshed by rest and recuperation. When one is exhausted and fatigued, the keen sense of propriety is lessened. Moral sensibilities previously acute are benumbed, and he is readily captured in the net which fortuitous circumstances or designing slaves to vice or crime may weave about him.

Thus it appears that health has a very important relation to morality, using the word in its common and narrow sense, and that no man who desires to live a pure and upright life can afford to run the risk of lessening his moral tone and his power of resistance to evil by impairment of his physical and mental vigor.

Millions in It.—Furthermore, it is the duty of every human being to make the very most of himself, and nothing is more important to a young man pre-

paring himself for his lifework than that he should make the most of his life, by preserving the highest possible degree of health. There are millions in it—millions of happiness, usefulness, even of wealth. A man without health, even if his burglar-proof safe contains the wealth of a Rothschild or a Vanderbilt, is poorer than the ragged newsboy whose clarion voice resounds with robust health, and whose rosy cheeks tell of the richness of the vital fluid in his veins; or the Italian peasant boy whose daily toil gives him a vigorous appetite for the handful of chestnuts upon which he dines.

The millionaire is rich in cash, but often poor in comfort. He has a heavy pocketbook, and a heavier heart; a table spread with costly dainties, but no appetite; a palatial abode, and a pain-racked body in it. The hydra-headed monster, dyspepsia, glares at him from every savory viand at the dinner table. When he ventures out to walk over his domains, a vexatious rheumatism causes him to make wry faces at every step. If in his magnificent turnout he seeks invigoration in the morning air, a veritable fiend, which the doctors have named *tic-douloureux,* drives him back to his overheated chamber, writhing with pain. When he lies down upon his luxurious couch, he sleeps not the sleep of health and physical soundness, but rolls and tosses restlessly about until a horrid nightmare settles down upon him, and holds him in its deathly grip. The glorious morning sun beams not with joy and gladness upon such a one. He rises languidly from his couch of torture, and begins another wretched day. The woodchopper, with his brawny arm, his mag-

nificent digestion, his sound rest, his ignorance of "nerves," nightmares, and neuralgias, is the envy of the millionaire, and justly so; he is the richer man of the two. The one has golden wealth, the other glorious health, and finds millions in it, though his pocket-book is thin, and his bill of fare a crust.

SOCIAL ETHICS

AMONG the obligations which human beings owe to each other, are courtesy and agreeableness. The man who robs his friends of the pleasure which they might derive from intercourse with him, by a coarse and brutish or otherwise disagreeable manner, is virtually a thief, for he deprives his associates of that to which they are rightfully entitled. We have elsewhere spoken of the value of courtesy as an aid to success, and need not here repeat what we have there said upon this point; and recognizing the fact that one of the essential requirements for agreeableness of manner in social intercourse is a knowledge of the customs and usages of good society, we append a few of the most essential rules of etiquette by which boys and young men should be governed in social intercourse among themselves and in polite society:

Introductions.—In matters of introduction, the proper form is to present the gentleman to the lady, a younger to an elder person, an inferior in social standing to a superior. It is the place of the person thus presented to open the conversation.

A slight bow is all the salutation which courtesy requires after an introduction. Shaking hands is optional, and it should rest with the one to whom the party is introduced to make the first advances. Shak-

ing hands evinces greater cordiality and friendliness than a simple bow.

If several persons are to be presented to an individual, the name of the single party should be mentioned first, and the others enumerated in succession, each bowing slightly as his name is pronounced.

If an individual is to be presented to a company, an announcement of the party's name, and his title if he is a professional man or an official, is all that is required.

Friendly letters of introduction should be given only to intimate friends, introducing them to persons with whom the writer is also well acquainted. Letters of introduction to business or professional men should likewise be given only to and for parties well known to the writer, and even in these cases, only when the writer is perfectly satisfied that an acquaintance will be mutually agreeable or profitable to both parties.

FORM OF LETTER INTRODUCING A PERSONAL FRIEND.

J. H. Hooker, Esq.

Dear Friend,—This note will introduce to you Hon. Thomas Jones, a very particular friend of mine, who desires to meet you. Trusting the acquaintance will be mutually agreeable, I remain, as ever,

Your friend,

William James.

FORM OF LETTER INTRODUCING A BUSINESS ACQUAINTANCE.

Messrs. Halloway & Co.

Gents,—I take pleasure in introducing to you Mr. Timothy Smith of this city, who visits New York for the purpose of purchasing goods in your line, and by my suggestion will call upon you. Mr. S. enjoys in this community the reputation of being a reliable and honorable business man, as well as a good citizen and a pleasant acquaintance.

Very respectfully yours,

John Richards.

Letters of introduction to and from business men may be delivered by the person introduced, and etiquette does not require the receiver to entertain the bearer as a guest or friend, though common courtesy will naturally suggest that such kind attentions as are practicable be shown him.

Letters of introduction of a friendly character should be sent to the person to whom they are directed, with the bearer's card and address. If the person receiving the letter feels favorable toward forming the acquaintance, he will call upon the party introduced, in person, or by note acknowledge the receipt of the letter with an invitation to call; or he may simply send his own card, when the bearer of the letter of introduction is at liberty to call upon him.

Upon the Streets.—An inclination of the head, a gesture of the hand, or mere touching of the hat is a sufficient salutation between gentlemen meeting upon

the street. A gentleman in saluting a lady or an elderly or superior gentleman, should raise the hat completely from the head.

A gentleman walking with a lady should bow to those who recognize her, even though he be unacquainted with them, thus showing respect for them out of respect for his companion.

Always bow to an acquaintance when meeting upon the street. It is a mark of ill-breeding to pass a friend unrecognized, and it is civility to return a bow, even if you do not recognize the person. He may be some one whom you have met and forgotten.

In bowing, it is not necessary to bend the body, simply an inclination of the head is sufficient. The recognition should be respectful, familiar, or cordial, according to circumstances, but never accompanied by a broad smile.

A gentleman walking with a lady should treat her with the utmost deference. He may take either side of the walk, the lady always being given the side least exposed to inconvenience, crowding, or danger. He should offer to carry any parcel she may have, and should adapt his pace to her pleasure. In a crowd, the gentleman should always precede the lady. Two gentlemen accompanying the same lady should allow her to walk between them.

It is not customary for a gentleman to offer a lady his arm, except when walking in the evening or upon an occasion when her safety, comfort, or convenience seems to demand it.

A gentleman should not join a lady acquaintance upon the street for the purpose of walking with her,

without first ascertaining whether his company would be perfectly agreeable to her. A gentleman wishing to converse with a lady whom he meets upon the street, should not stop her, but turn and walk with her until he has said what he wished, and should then, lifting his hat, bow and leave her.

On entering or leaving a store, house, or room with a lady, the gentleman should hold the door open and allow her to pass through first. A gentleman meeting a lady in a doorway, should stand aside, lift his hat, and wait for her to pass; or if the door be closed, should open it, and hold it open until she has passed.

Do not shout across the street to an acquaintance. All loud talking, laughing, or staring upon the street or in public places is decidedly vulgar. *Gentlemen* do not stand upon street corners, or lounge about hotels and stores, and talk about and stare at ladies as they pass.

To eat fruit, nuts, confectionery, or anything else on the streets, is not in good taste.

Looking back, after one has passed a person or an object, is not considered proper, unless the occasion be an extraordinary one.

Calls.—In making a short formal or business call, a gentleman should carry his hat and gloves, which are considered part of his toilet, in his left hand, but should not place them on the chairs or parlor table. If found necessary for some cause to use both hands, the hat should be placed upon the floor beside his chair. Umbrellas should be left in the hall or at the door.

In making informal calls or visits, the hat, gloves, cane, and overcoat should be left in the hall.

An informal call may be at least fifteen minutes long, but should not be so long as to be tedious.

Upon entering a drawing-room where a number of people are present, a person should bow slightly, as a general salutation, before speaking to any one.

Choose a time to withdraw when there is a lull in the conversation; and after taking leave of the hostess, bow to those in the room, not separately, but to all at once.

Upon rising to take leave, go at once; do not start and then linger.

Never call upon a professional man or woman in office hours, except on business, and always make the interview as brief as consistent.

In calling upon parties living in a hotel or boarding-house, it is customary to wait in the general parlor, and send up your card to the room of the person on whom you have intended to call.

Always be punctual in keeping an engagement. One has no right to waste the time of others by keeping them waiting.

Do not ask the price of any article you may observe belonging to another, except from intimate friends, and then only on asking permission to do so.

Do not walk about a room while waiting for your host, examining pictures, handling articles about the room, or striking upon the keys of an open piano.

Conversation.—Do not intrude business or professional matters into general conversation unless questioned by those participating. Long and heated discussions should always be avoided.

In conversation, aim to acquire the habit of talk-

ing sensibly and with facility on all subjects of general interest; and when in company with others, let the topics brought up be those in which all are interested.

Avoid, especially, all gossip and scandal.

Neither correct nor appear to notice an error in pronunciation or grammar made by a person with whom you are conversing.

Do not try to force yourself into the confidence of others, nor pry into their private affairs by questioning; but if they give their confidence, never betray it.

Do not feel it incumbent upon yourself to carry your point in conversation; and when avoidable, do not discuss topics which arouse feeling and heated argument.

Never parade your accomplishments, nor affect superiority in any particular. In the company of an inferior, never endeavor by your conversation or manners to cause him to feel other than your equal.

In your conversation and conduct, adapt yourself so far as possible to the persons in whose company you chance to be (providing, of course, that you do not choose to throw yourself into low or disreputable company). Make it a rule to study the pleasure of those you are with, and listen to and talk about the subjects of conversation which most interest them.

Never attract attention to yourself by loud talking or a dictatorial manner. Allude to personal affairs as little as possible, and do not parade the fact that your friends or family may be wealthy, of noble birth, or possessed of any superior advantages.

Never answer another curtly or impatiently, and

never hesitate to offer an apology at once when one is due.

Do not monopolize the conversation, nor engage in a whispered or private conference in the presence of others, or converse in a foreign language not known to all present.

Never ridicule others, nor seem to notice by word or look any peculiarity of dress or person of another.

Do not read newspapers, books, or letters in company. If necessary to do so, beg to be excused.

Avoid all slang. Do not laugh at your own wit.

Avoid mimicry.

Do not interrupt another while speaking.

At Table.—Never lean upon the table with the elbow, or drum with the fingers, and do not toy with knife, fork, or spoon. Never make use of a napkin in place of a handkerchief, for wiping the face or nose.

It is considered contrary to etiquette to shovel one's food into the mouth with a knife. Everything that can be eaten with a fork should be taken with that utensil alone. If necessary to use a knife, use it only for dividing the food, and convey it to the mouth with a fork.

Bread should be broken, not cut. Use a spoon for soup and puddings. In eating large fruits, like apples and pears, divide the fruit with a knife, partaking of it in small portions.

Keep the mouth closed while masticating food. Both eating and drinking should be performed slowly and noiselessly.

If a plate be handed you at table, always retain it, unless asked to pass it to your neighbor. It is to be

speech of another, do not allow it to be apparent by any visible sign of uneasiness.

Avoid loud talking and gesticulation. If necessary to indicate an object, do so by a slight movement of the whole hand or head, but never point with the finger.

Neatness of attire and cleanliness of person are especially essential, if we desire to be considered agreeable in society. A person may have any amount of goodness and ability; but if his appearance bespeaks the sloven, his presence will not be desirable to persons of refinement. Especial care should be taken of the hands. They may be stained and roughened by honest toil; don't be ashamed of that, but take off all that soap, warm water, and a good nail-brush will remove.

Never exhibit the weakness of supposing that people of refinement will find your presence welcome or desirable if your hair and clothing are saturated with the filthy odors of spoiled hair-oil and perfumery, to say nothing of tobacco, cigars, and alcohol, or a neglected skin.

If one would be polite in public, he must be so at all times and with all persons. The man who is uncivil to a washer-woman or kitchen maid, will be in great danger of being impolite to those whose good opinion he desires to possess.

Do not speak of persons outside the family circle by their Christian names, nor address them by such when in the company of others.

In addressing persons, avoid undue familiarity, such as the use of nicknames, patting a person upon the back, etc., remembering the familiar rhyme—

"The man who calls you Tom or Jack,
And proves by thumping on your back," etc.

Treat the religious beliefs of others with the utmost respect; and in talking upon religious topics, avoid cant and exhibitions of bigotry.

Always hand a chair for a lady, pick up any article she may have dropped, and do any other little service she may seem to require, but do not press attention upon her.

If differing from another in opinion, do not directly contradict him, but courteously beg pardon, and say, "I think you have been misinformed," or "are mistaken," or in some like phrase modify the bluntness of a contradiction.

Gentlemen should always precede ladies in entering a church or other audience room.

The basis of all true politeness is the Golden Rule, "Whatsoever ye would that men should do to you, do ye even so to them."

A French writer has said, "To be truly polite, it is necessary to be at the same time good, just, and generous."

No true gentleman will use tobacco in any form, or indulge in alcoholic drinks under any circumstances. The use of these poisons is inconsistent with real gentility, and benumbs the finer sensibilities of those addicted to them.

Special Rules for Boys.—Always remove the hat upon entering a house.

Never enter a private room or the room of a guest without knocking.

Always offer your own seat to persons entering a room, and never keep a seat, either in a house, church, or public conveyance, when a lady or an elderly gentleman is standing.

Never slam doors. Do not run up and down stairs. Do not slide down the banisters. Step lightly, quickly, and orderly at all times within doors.

Never be rude or boisterous to your sisters or playmates. Avoid loud shouting and rude merriment; never indulge in slang phrases, and never jostle nor push in a crowd.

Always clean the boots or shoes well before entering a house or schoolroom.

Never throw hat, coat, boots, or school-books about the room for mother or sisters to take care of; but have a place for everything, and keep everything in its place.

Never go to the table nor sit down in the presence of ladies with unkempt hair, soiled clothing, or muddy shoes.

At all times show as much deference to mother and sisters as to any other ladies.

Never elevate the feet upon tables, cushions, sofas, or chair backs.

Never laugh at nor ridicule a person in any way because of patched clothing, deformity of person, or peculiarity of any sort.

Never stare at people, and never interrupt when another is speaking.

Never try to appear clownish, nor use vulgar, indecent language.

GETTING A WIFE

THIS is a question in which most young men sooner or later become interested, and which is worthy of the most careful and candid consideration. The formation of a partnership for life is a transaction of no small importance, and demands cool, deliberate judgment, and the careful weighing of numerous considerations, rather than rash obedience to the dictates of a blind and impetuous passion. Marriage is an institution which involves in the most important manner all the relations of life, physical, mental, moral, and social. The brief space which we have to devote to the subject compels us to confine our considerations chiefly to its physical relations.

Relation of Marriage to Health. — It is clearly shown by the statistics of various countries, that married persons of both sexes enjoy longer life than single persons do. This is probably due, in the case of males, to the greater regularity of life and freedom from those disorders which are the penalty of those profligate habits to which a large proportion of single men are addicted. In the case of women, who incur greater risks in the marriage state than men, the longer life is probably due to the relief from mental strain and worry which most women experience, especially in later years, though it must be admitted that quite too large a pro-

portion of married women do not find in marriage that quietude and satisfaction which they have been led to expect. On the whole, however, there is no question that the tendency of marriage is to prolong life, and to conduce greatly to individual welfare and happiness when its ends are not perverted and its privileges abused.

Traces of the marriage institution are to be found in the social usages of all nations, even the most barbarous tribes exhibiting some knowledge of the advantages to be derived from the establishment of the family relation. One of the distinguishing features of nations of the highest grade of civilization and intelligence is the high degree of regard in which the marriage institution is held. When a nation begins to deteriorate, one of the first symptoms of social degradation is neglect and disregard of marriage obligations. The growing infrequency of marriage in this and some other civilized countries, and the increasing multiplicity of divorce cases which crowd the courts, especially in some parts of the United States, are evidences of disease in the social and moral life of nations, which demand the earnest attention of all workers for the good of humanity.

The Object of Marriage.—The primary object of a union of the sexes is the propagation of the species. Marriage, however, involves much more than this. It is an institution peculiar to humanity, and, in its highest form, is characteristic of the most enlightened grade of humanity. It involves a union of other and far higher than mere sensual interests,— a union by which both of the contracting parties retain their individu-

ality and all their individual rights, notwithstanding the community of aims and purposes which characterize a genuine matrimonial alliance.

Men sometimes view their wives very much as they do fine houses, lands, horses, or other valuable possessions. It is needless to remark on the gross selfishness of this view of marriage. The natural, inalienable rights of every human being render it impossible for any one to become proprietor over another. There is no rite or ceremony, no law, human or divine, by which the natural rights of a woman may be abrogated in favor of a man. It is important in the interest of men as well as women that men should consider this fact, and grant to their wives as great liberty of conduct, opinion, and conscience as they themselves claim.

A man who looks upon his wife as a mere chattel, or simply as a means of sensual gratification, entertains too base a view of marriage to be worthy of any woman, unless she is as gross and sensual as himself. While marriage gives opportunity for unbridled gratification of the animal instincts, morality and the recognition of the physiological objects of marriage, restrict such gratifications within very narrow limits. The man who most thoroughly appreciates and enjoys the marriage relation, is he who restrains and controls the animal passions within the limits of physiological law.

Who Have No Right to Marry?—The idea that every man has a right to marry any woman who chooses to accept him as a husband, is a mistaken one. Two parties are mutually interested in the marriage relation, and each has rights which must be considered. It

is evident that all men are not prepared to become desirable husbands. This may be due to inherited or acquired defects and diseases, or to the possession of various other undesirable qualities. The man who marries, expects, at least, to obtain a woman who will be a desirable wife, and if disappointed, considers some one blameworthy. A woman, in marrying, has an equal right to expect in a man desirable qualities as a husband. We do not say that a man, to be fit to marry, must be possessed of the highest grade of qualification; but he ought, at least, to possess merits sufficient to be worth marrying. There is still another party whose interests must be considered, namely, the offspring. Under ordinary circumstances, a man who is incapable of begetting healthy children, ought not to marry. The world is full of the offspring of worthless fathers, and it is high time that the obligation of parents to beget healthy children was recognized as a moral duty, and the voluntary begetting of children infirm in body and mind, as a crime against humanity and civilization. But let us notice a little more particularly the qualifications of those who have no right to marry.

Boys Should Not Marry.—Though the laws of nations differ much respecting the age at which marriage is permissible, anatomy and physiology most emphatically assert that persons who have not attained complete physical development have no right to marry. The law of heredity stamps upon the offspring the image of the parent. If the father has not yet attained maturity, in other words, if he is still a boy in mind and body, his boyishness will be indelibly stamped upon

his child. This fact undoubtedly accounts for at least a great number of individuals, who, though old in years, exhibit such puerilities of character as to completely negative, in their cases at least, the adage, "Gray hairs bring wisdom." A man who wishes to obtain a vigorous and hardy horse, would certainly not select one that he knew had been sired by a colt. Boys who contemplate marriage, ought to know that the same laws which govern the propagation of other members of the animal kingdom, hold good respecting the propagation of the human species as well, and should consider seriously whether the sons and daughters of a boy-father will be a valuable addition to the human race.

When to Marry.—The age at which it is proper for a man to marry is indicated by that at which he attains maturity, which is about twenty-five years. Prior to this age, he is really a boy; his bones have not yet completed their development; the character is not yet completely formed through the development of the mental faculties, and the whole body is immature. Among certain ancient nations, marriage was not permitted until some years later than the age named; and it must be admitted that the people among whom this practice prevailed, attained a higher degree of physical development than any nation known to ancient or modern times.

Old Men Ought Not to Marry.—Perhaps this statement is a little too sweeping, but all intelligent persons who have had opportunity for observing the results of marriage in old men, will testify that in nine cases out of ten they are anything but desirable. This is espe-

cially liable to be the case when the old man marries a woman much younger than himself. Nothing is more obnoxious to good sense, and we might perhaps say morality, than the union of an old man just entering upon his second childhood with a young and blooming girl. Such a matrimonial alliance means, in most cases, speedy death for the one, and infinite misery for both. If the old man must marry, let him take a wife about his own age, who is prepared to lead a calm, quiet life, which is natural to the aged as well as essential for their physical, mental, and moral welfare. The old man who contemplates taking a young girl for a wife, should reflect that such an action is contrary to natural instincts, and that it is likely to be prompted by animal desires which, for his mental happiness and his physical and moral safety, should have been long ago extinguished. On the other hand, the young lady has probably been led to consent to such an unnatural union by the allurements of wealth, social position, or some other motive foreign to that real affection which constitutes the basis of true marriage. The relation which such a woman sustains to her legal husband in the eyes of natural, and, we may almost say, moral law, is that of a mistress rather than that of a wife. The old man who values his peace of mind, and who would avoid the unhappy fate of him whose gray hairs go down in sorrow to the grave, will wean himself from the extravagant, and, for him, dangerous excitements of love, and content himself with those mild and quiet enjoyments, which, while less fascinating and intense in character, are vastly more enduring, and, in the end, afford greater satisfaction.

A Worthless Man Should Not Marry.—A man who is "good for nothing," who is unable to add anything to the world's store of knowledge or wealth, or to contribute to the happiness of his fellow-beings, who is slovenly, debased, groveling, shiftless,— such a man not only has no right to marry, but commits a crime in doing so. What must be the lot of the wife of such a husband! The woman who has been betrayed into marrying such a man, is condemned to a life the most wretched imaginable. Some such women we have seen, —women who, under favorable circumstances, might have been lights to society, who might have wielded a mighty influence in the elevation of their fellow-men, but who were bound hand and foot by the cruel ties of an unfortunate marriage, chained to a worthless clod who is incapable of usefulness himself, and a most efficient hindrance to the usefulness of others.

The man who contemplates marriage and wishes to marry a good and worthy woman, should consider, first, whether he is himself worth marrying; and if a candid introspection convinces him that he is not worthy of such a wife as he desires to marry, let him at once begin such a work of self-culture and discipline as will elevate him to the standard by which he would measure the woman he desires to win.

A Wicked Man Should Not Marry.—Recent investigations respecting the causes of crime have revealed the fact that the disposition to crime, as well as other mental and physical qualities, is hereditary. A man who is a thief, a robber, or a murderer, begets children with the same evil propensities. The intermarriage of wicked and vicious persons has resulted

in the production of what is known in every country as "the criminal classes." Through this means, notwithstanding the continued efforts of "reform schools," "homes," "asylums," and a great number of other reformatory enterprises, crime is continually increasing, and in a ratio far greater than the growth of the entire population. Something ought to be done to check this propagation of vice, this most efficient means of recruiting the class of men and women who oscillate between the brothel and the almshouse, the gutter and the prison. The marriage of such persons ought to be prohibited by law. It certainly ought to be discountenanced by society. The clergyman or the justice of the peace who knowingly performs a marriage ceremony by which a wicked man is made a husband and a possible father, does a wrong to society, the commission of which ought to annul his authority to administer so important a rite.

Young men who have spoiled themselves by a career of vice or crime, are usually of all men most particular respecting the character of those whom they seek to marry, and are particularly fond of selecting for wives, young, pure, and unsophisticated girls, who know nothing of the evils or vices of the world. Sometimes such a union seems to result well enough, the influence of purity and virtue in the one predominating over the tendency to vice in the other; but this is by no means universally the case. If the young woman, once pure and good, is not contaminated by contact with one who is thoroughly defiled by sin, and gradually demoralized, her existence is one of perpetual wretchedness. Instead of those noble qualities of mind and heart which she

might admire and respect, she finds only selfishness, sensuality, and moral rottenness.

Young women are not infrequently led to marry men whose characters are known to be bad, with the idea that they may reform them. Sometimes, indeed, this Herculean task may be accomplished; but quite too frequently the reformation, even if apparently accomplished, is only transient, and the man who in the days of his courtship promised to be his wife's highest ideal of pure, noble manhood, lapses into the pit of moral corruption where the vile practices of years have dragged him. The young man who offers to a woman, as an inducement to marriage, the opportunity to reform him, is, in ninety-nine cases out of a hundred, a hypocrite of the deepest dye. A man who really wishes to reform, will reform himself; and until a thorough reformation has been effected, he has no more business to ask a pure woman to marry him than if he were suffering with the smallpox or the leprosy. The fact that there are women so unwise or so inexperienced as to be willing to accept such a man for a husband, does not remove the responsibility from the place where it belongs, on the shoulders of the man who has made himself, by his vices or his crimes, unfit and unworthy to be the husband of a good woman.

Epileptics Should Not Marry.—There are few forms of nervous disorders more horrible in their agency, or more certainly destructive of the mind, than epilepsy; and to the terrible effects of this disorder upon the individual is added the almost mathematical certainty of its transmission through heredity. An epileptic father or mother begets insane or epileptic children. A

person afflicted in this way for many years should abandon all thoughts of marriage, even though the disease may be temporarily stayed through the influence of powerful remedies. If the disease has occurred as the result of some injury to the nervous system after maturity has been attained, or has been produced by functional disturbances of the stomach or liver, or from nervous exhaustion from some cause, and has been cured by the employment of the proper measures, the individual need not be forbidden to marry, provided the lapse of two or three years has proved the permanency of the cure; but when the disease is the result of heredity, or has existed since early childhood, the prospect of a permanent cure is exceedingly small, while the probability of transmission by heredity in case children are begotten, is almost a certainty.

Persons of Insane Temperaments Should Not Marry. — Cases have undoubtedly occurred in which persons who were really insane have married and reared families, but there is probably no one who would defend the propriety of such a marriage. The children are apt to exemplify the old adage, "Like father, like son," and at an early age are found in our reform schools, prisons, or lunatic asylums. These cases are, however, not sufficiently common to be the source of any great amount of harm. The greatest danger lies in the propagation of a tendency to insanity through the marriage of persons possessing what is known as "the insane temperament." These individuals are generally found in families in which insanity has developed in one or more members. They are usually peculiar, crotchety, and eccentric. Familiarly known

as "cranks," they are made the butt of ridicule. Their erratic utterances and conduct are laughed at by unthinking people, who consider them simply as amusing and peculiar people, entertaining no suspicion that in the crotchety brain of the crank lies the germ of that most terrible of all human maladies, insanity. The children of a crotchety man are likely to be still more unbalanced than himself, and what is in the father simply an eccentricity, develops in the child into some one of the various forms of mania.

The young man who is aware of the fact that insanity is a prominent feature in his pedigree, and who has not the most indubitable evidence that his physical and mental characteristics follow the line of a healthy and well-balanced ancestor, rather than that of the mentally disordered one,— such a man commits a crime when he takes upon himself the responsibility of marrying and bringing into the world recruits for prisons and lunatic asylums.

Should Consumptives and Scrofulous Persons Marry? — The rapid increase of consumption, as indicated by the mortality from this disease, which constitutes nearly one-fifth the total number of deaths in old-settled countries, points unmistakably to the fact that some potent cause must be in operation, causing the propagation of this malady. The observations of scientific physicians have fully established the view that the tendency to consumption, as well as the disease itself, is hereditary, and the evidence that the same is true of scrofula is too strong to be doubted. When one considers the terrible ravages of these two constitutional maladies, can there be any doubt as to

the impropriety of the marriage of those who have a clearly marked tendency to these diseases, at least unless such a tendency has been thoroughly extinguished by a careful regimen and a proper course of physical culture?

May Syphilitics Marry?—The horrible hereditary effects of this frightful malady ought to be sufficient to deter any one in whose breast all sense of obligation to his fellow-men has not been obliterated by long years of slavery to vice and crime, from incurring the risk of inflicting such wretchedness and suffering as is almost certain to be experienced by his offspring. Certainly, no man who has suffered from syphilis has any right to offer himself in marriage to a woman who is not, like himself, contaminated by the physical and moral taint of this disease.

Innocent and unsuspecting women often suffer life-long injury through marrying men who by fast lives have acquired gonorrhea, or gleet. This disease, sometimes even when apparently cured, or when existing in so slight a form as to be hardly noticeable in the man, may give rise to most painful and distressing disorders in a woman. We have met a number of cases in which women who, until the day of their marriage, had enjoyed perfect health, had since marriage never been one day free from pain and suffering from this cause. The author holds that a man who has suffered from even the milder forms of venereal diseases, has no right to marry without acquainting his intended wife with the full facts as to his condition, and then not until several months have elapsed since he has been pronounced by a competent physician to be free from the last trace of the disease.

May a Drunkard Marry? — The man who is a slave to drink has no right to ask any woman to share his shame, or to aid him in rearing children who are stamped at the moment of conception with a morbid craving for alcoholic drinks. The man who is determined to destroy himself with drink, should be content to destroy himself alone, and not insist upon dragging others down to his own degraded level. Hundreds of thousands of women's lives have been wrecked by being beguiled into marrying young men addicted to drink, by the promise of reform upon condition of doing so. In by far the greater number of these cases, six months do not elapse after the ceremony before the young man returns to his cups, and the young woman is left to repent her folly during a life of wretchedness.

Should an Improvident Person Marry? — Will any one question the assertion that a man who is not able, through mental or physical incompetency, to support a wife, has no right to marry? Thousands of young men rush blindly into matrimony without stopping to think of the ways and means by which a family is to be provided for, trusting to luck, or perhaps to the efforts of the wife, to provide bread for hungry mouths which they are themselves incompetent to feed. No young man has a right to marry until he has acquired a trade or a business which will insure at least a comfortable livelihood for those dependent upon him. The author is of the opinion that it would be wise if young men were required by clergymen and other parties authorized to administer the rite of marriage, to produce evidence of the ability to support a wife and family before the performance of the marriage ceremony.

Whom to Marry.—The young man who desires a wife will certainly not wish to select a young woman possessing any of the characteristics pointed out as undesirable in young men. As a rule, young men are far more particular respecting the personal character of those whom they seek in marriage than are young women. Nevertheless, impetuous though worthy young men not infrequently commit serious blunders in the selection of a life partner; hence the following suggestions may prove serviceable:

1. Be careful to become well acquainted with the young woman whom your fancy may have chosen, before asking her to become your wife. An acquaintance formed at a party, picnic, sociable, or during moonlight walks, or evening parlor chats, is of very little value in forming the basis for a proper estimate of character. Young ladies who are in search of husbands, naturally do their best to appear to good advantage, and are very likely to appear so if the thing is possible for them, when on exhibition, as on such occasions as those referred to. A thorough knowledge of a young lady's character will necessitate a thorough acquaintance with her conduct at home, her behavior toward her parents or brothers and sisters, her personal habits, etc. Is she respectful to her parents and thoughtful of their wishes? Is she kind and gentle in her behavior toward her associates? Does she respect religion, or is she irreverent and irreligious? Is she quiet or boisterous? Is she haughty and overbearing? Is she simple in her tastes, or does she love pomp, display, and excitement? Has she pure, refined, and womanly sentiments, or is she flashy and vulgar? Is

she cheerful and happy in disposition, or gloomy and morose? Is she neat and tidy in personal appearance, or lax and careless? All these are questions, the answers to which decide whether your married life is to be happy or wretched, peaceful and enjoyable, or in the highest degree infelicitous.

2. Do not marry a flirt. A young man who is seeking a wife should avoid, as he would a scorpion, the professional flirt. A woman who has made a pastime of breaking hearts, carries in her breast a heart as incapable of genuine love as the hardest rock. Do not waste any affection on such a woman, no matter how great her accomplishments, or how alluring her charms. If your feelings have become in the slightest degree entangled, make haste to effect your escape from the snare. Such a woman can no more make a happy home than she can fly. Her conscience is seared, her sensibilities blunted, her affections decayed. If you have been deceived by her, consider yourself fortunate in having escaped the greater calamity of marrying her.

3. Do not marry a woman of fashion. A woman whose life is devoted to following the ever-changing fashions of the day, has no room in her heart for domestic love, and no time to devote to the business of home-making. She may possess many excellent traits, and many admirable qualities, but she has been spoiled by erroneous education. She knows nothing of the simple arts by which a home is made comfortable and happy; and if you should be unable to supply all the demands of her morbid and artificial tastes, she will soon cease to love you altogether, and render your life wretched by her importunities or her reproaches.

4. Seek a healthy wife. In this degenerate age, among civilized nations at least, health, especially among women, has become an exception rather than a rule; and so long as men are willing to accept as wives pale, puny creatures who, though very "interesting," are very helpless when brought face to face with the stern realities of life, women will continue to attach little importance to physical culture as a preparation for wifehood and motherhood; but if all the young men in the country insist that the young women whom they select as wives should possess good health, gymnasiums for young ladies will quickly start up in every corner of the land; piano thrumming, embroidery, daubing with water-colors, and sentimental poetizing will fall into disrepute; the homely art of housekeeping will supplant some of the so-called fine arts which are now cultivated so assiduously by persons who have really no more taste or natural genius in this direction than a backwoodsman or a blacksmith; and young women will become as proud of depth of chest, largeness of waist, and hardness of muscles, as they now are of their small arms, *petite* figures, and general helplessness.

A young woman who has emasculated her womanhood by tight-lacing and wearing French-heeled shoes, and who is given to fashionable dissipation, is no more fit to marry than she is to perform as an acrobat or a pugilist. No young man possessed of average good sense will marry a woman who has squeezed her liver out of shape, compressed her stomach out of place, and, to use a printer's phrase, made a "pi" generally of her "internal arrangements" by tight-lacing.

Don't Be in a Hurry.—When "head over heels in love;" a young man is almost always in a desperate hurry to press his suit to a favorable culmination. Don't be too fast, young man. Wait a little while for the impetuosity of the first tender passion to wear off. Then you can take a calmer view of the case, and will be better prepared to form a deliberate and correct judgment. Love at first sight is very apt to be as blind and unwise as it is impetuous. Keep fast hold upon your feelings, and wait until sure that you will not be making a terrible mistake in following your impulses. The love which is most enduring is not one which is simply a sentiment; but is the result of sentiment reenforced by reason and judgment, deliberately exercised. Such a love does not wane with the honeymoon, but grows fuller, richer, and stronger with the lapse of years.

What about Temperaments?—Much has been said about the proper adaptation of temperaments in marriage. One recommends persons of like temperaments to marry; while another, who claims to be equally wise, declares that opposites constitute the proper combination. The only word we have to say on this point is that, irrespective of temperaments, persons should be congenial. It is folly to lay down rules by which people should "fall in love." Such rules would never be followed, and would be very likely to cause more mischief than good. People whose tastes are unlike, if possessed of real affection for each other, will naturally approximate their tastes until a happy and congenial mean has been reached. It is wise, perhaps, that those who are constitutionally feeble should seek to remedy

the defect for their children by selecting a partner possessed of a high degree of physical vigor. By this means, marriage may become the means of improving the race. The inter-marriage of feeble persons would naturally tend to deterioration.

Should Cousins Marry?—Experience indicates that the children of cousins are far more likely than others to be afflicted with deafness, idiocy, and other physical and mental defects. This is particularly apt to be the case if both possess the characteristics of a common ancestor. In view of this fact, it is evident that cousins ought not to marry, certainly not unless there is evidence of the most positive character that they follow different ancestral lines.

Lastly, if you wish to obtain a good, pure, noble, lovable woman for a wife, be careful to make yourself a good, noble, lovable man. If you do this, you may be sure that sooner or later you will have the good fortune to meet the woman who will exactly embody your ideal of a wife, and who will recognize in you her ideal of a husband.

An Evil Heritage

A PHILOSOPHER has said, "To be well born is the greatest of human felicities." Unhappily for the human race, this good fortune comes to but a small proportion of the human family. Not every one is so unfortunate as poor "Pip," the hero of "Great Expectations," who said that he was always treated as if he "insisted on being born in opposition to the dictates of reason, religion, and morality;" but certain it is that if reason, morality, and common sense were allowed to dictate the matter, many thousands of poor, wretched, unhappy human beings would never have been born at all. Thousands of miserable beings received from their parents a heritage of boundless wealth in the line of lands, houses, and bank accounts, but the direst poverty as regards that most valuable of all treasures, health. The child who inherits from its parents a frail and feeble constitution, incompetent to cope with the exigencies of life, without the physical vigor necessary to sustain the effort required to prepare for or to lead a life of usefulness, has an evil heritage for which no amount of money, "good name," or worldly wealth can possibly compensate. On the other hand, the man who inherits from his parents a sound body and a large fund of vitality, may well consider his legacy a rich one, although he may be born in obscurity and left penniless.

We have spoken of a good constitution; let us consider for a moment what a constitution is. One man, we observe, is able to perform a great amount of labor, to endure hardships, to withstand the attacks of disease, and to live to a good old age in enjoyment of health and physical strength; while another man wilts under physical conditions far less adverse, like a delicate flower beneath the scorching rays of the sun. One has a good constitution; the other has a feeble one. The human body is in many respects much like a machine. Like a chain, its real strength is simply the strength of the weakest link; or, like a complicated apparatus, its actual strength is the strength of the tiniest wheel, or the most delicate pinion. A machine constructed with all its parts properly adapted to each other, none stronger and none weaker than they should be, each capable of doing its duty regularly and without undue friction—such an apparatus may be considered as a machine with a good constitution. It will many times outwear a poorly constructed or unbalanced machine, in which undue strain is allowed to fall upon parts not prepared to bear it safely.

How Constitutions Are Ruined. — That a boy inherits from his parents peculiarities of temperament, complexion, expression of countenance, even peculiarities of gait, are matters of common observation. If a boy has an unusually large nose, a prominent chin, a special genius for music, poetry, or mathematics, we expect to find the same characteristics in his parents or somewhere among his recent ancestors. No one questions that these physical and mental traits may be readily transmitted from parents to children. "Like

father, like son," is a trite proverb which applies to grandfathers and great-grandfathers, grandsons and great-grandsons, as well as to fathers and sons. If external features are thus transmitted, who can doubt that the internal likeness between children and parents is equally as great? In other words, can it be questioned that a father transmits to his son his quality of lungs, liver, heart, brain, and nerve, as much as his external form?

A father once brought to us a son for medical examination. A moment's glance at the lad showed that he was a boy of feeble constitution. In reply to our question, "Was your son a healthy infant?" the father replied, "No; he was such a puny baby we thought we could not raise him." And what wonder? The reeking fumes of tobacco plainly told that the father was a tobacco slave. The cigar or the quid was his constant companion during his waking hours. He said he was "tough as a knot." Never had a fit of sickness in his life. Could eat anything he liked, and usually did. Had smoked and chewed ever since he was a little boy, and "knew it didn't hurt him." It seemed to him very strange indeed that he should have for a son such a puny, dwarfed specimen as was the twelve-year-old lad whom he presented for examination. There are thousands of fathers who have just such sons, and thousands of sons who are so unfortunate as to have just such fathers.

Some years ago a man in the prime of life applied to us for an examination of his heart. Investigation showed great irregularity. He complained of palpitation, sudden faintings, and other very serious symp-

toms, which indicated great weakness of the heart. An examination with the stethoscope fully confirmed the evidence of the pulse and other symptoms. It was evident that he was suffering from narcotism of the heart, the result of tobacco-using. When the true nature of the case was explained to the patient, he at once exclaimed, "How is it possible that the small amount of tobacco which I have used should affect me so seriously, when my father and mother both used tobacco all their lives, and it didn't hurt them? They are healthy old people now." Here was the secret. His father and mother had squandered their heart strength in tobacco-using, and the young man had inherited a weakness in this particular, which rendered it impossible for him to use the weed without speedily suffering serious consequences.

Some Bad Legacies.—The transmission from parents to children of actual disease is perhaps infrequent; but the transmission of constitutional weaknesses and tendencies to disease are exceedingly frequent. It may perhaps be questioned whether acquired morbid conditions are readily transmitted by heredity; but no one who has been a close observer of men from a medical standpoint will hesitate to accede to the affirmative view of the matter. If further evidence than that which is presented by common observation were needed, it is afforded by a curious experiment made some years ago by Dr. Brown-Sequard, of Paris. This celebrated physiologist, in the course of a series of experiments upon guinea pigs, found that by irritating a very small spot in the brain of the guinea pig, a disease was produced which exactly corresponded to epilepsy in human

beings. The general health of the animal did not seem to suffer greatly, but it became subject to those frightful convulsions which constitute the leading symptom of this most horrible of all nervous disorders.

Continuing his observations, Dr. Brown-Sequard discovered that the disease was transmitted to the offspring of the animals operated upon, proving beyond any possible question that an acquired disease or morbid condition may be transmitted from parents to children. Let us devote a little space to the consideration of some of these unfortunate inheritances.

Consumption. — That consumption runs in families is a fact familiar to all. One of the first questions asked the candidate for life insurance by the examining officer is, "Did your father or your mother die of consumption?" No insurance company considers it prudent to insure the life of a man whose father or mother or any other near relative died of this disease. A consumptive tendency is one of the worst of the physical legacies which a child can inherit from its parents. With such a heredity, a man has ever staring him in the face the prospect of an early death, of being cut down by the great destroyer just as he is prepared to engage actively in the earnest duties of life.

A tendency to consumption may be inherited from a father who was not himself a consumptive, and did not die of the disease. A man whose lungs are naturally strong and whose constitution is vigorous, by sedentary habits, by insufficient exercise, by confinement in poorly ventilated rooms, by a general neglect of the laws which govern healthy action of the lungs, may so weaken and deteriorate these important vital organs

that their inherited weakness may be transmitted to his children. Thus a disposition to lung diseases of various types may be originated.

Weak Stomachs and Livers.— America is reputed abroad to be a nation of dyspeptics. Said an English physician to the author one day, while chatting in a pleasant drawing-room in London a few years ago, "I suppose, Doctor, in your practice in America, a large share of your patients are dyspeptics?" This unfavorable opinion regarding the American digestion is perhaps a little exaggerated; nevertheless, it is undoubtedly true that fully one-half the entire population suffer more or less with digestive disturbances.

Among the rising generation, in particular, it is difficult to find a dozen young men among whom at least three or four are not confirmed dyspeptics. The almost universal use of "pills" speaks of the unhappy condition of the average American liver. Overburdened with sweets in the form of sugar, preserves, confections, and candies, clogged with fats in the form of pastry, rich gravies, fat meats, etc.; goaded by pepper, mustard, pepper-sauce, vinegar, Worcestershire sauce, and every other sort of burning thing called condiments; gorged by habitual excess in eating or holiday gormandizing,—the poor organ, after struggling years to do its duty well, abandons the task in hopeless despair, and settles down into that condition of stubborn debility called torpidity. The child of a man with such a liver is born with the same organ weak and torpid. Almost from the moment of his birth, the regular daily dose of castor oil, or "Castoria," or some other abominable drug, begins; and thus the

inherited torpidity of the liver is aggravated. Is it any wonder that the child of such a parent grows up to manhood a chronic hypochondriac, a confirmed misanthropist?

Disordered Nerves.—Visit the primary department of a large school. Look over the little faces turned up to the visitor, and observe how few of them do not show unmistakable evidence of an inherited debility of the nerves, which threatens to mar the usefulness, and undermine the happiness, and perhaps make entire shipwreck of a mind which, backed by a well-balanced body and sound nerves, might be capable of attaining to the highest usefulness. The sparkling eyes, restless manner, abnormal irritability, or perhaps remarkable precociousness—all suggest that the early maturity will be followed by an equally early decline, and that the individual's entire career will be marred by the evidences of the impulsiveness and deficient judgment which are characteristic of so many young men of the present period. It is these forms of nervous excitability which produce the speculative disposition, and which incline a man to become a stock broker or a dealer in "margins," or predisposes him to various crimes and vices, as intemperance, gambling, etc.

Some years ago a mother brought to us her son, a beautiful boy of six summers, who was suffering with that most terrible of nervous maladies, epilepsy. Almost daily the little fellow was thrown headlong upon the ground by his disorder, often injuring himself, sometimes seriously, notwithstanding the careful and almost ceaseless watching of his mother. Strict

inquiry showed no cause whatever for the strange disease in the personal history of the child. The mother was a strong and healthy woman, but the father was excessively addicted to the use of tobacco and to some other vices. Here was a marked cause for the peculiar affliction of the child; and yet the father was loath to believe that his indulgence in tobacco, liquor, etc., could possibly bear any relation to his child's misfortunes.

Insanity.—Most distinctly hereditary in character is that other terrible malady of the mind, insanity. A father narcotizes his brain with tobacco, or excites it with alcoholic drinks, and the mother depraves her nerves by the habitual use of chloral or opium. Is it any marvel that the boy who happens into the world through such a parentage, shows symptoms of mental unbalance? that his mind often trembles upon the brink of mental dissolution? or that he ultimately ends his days in a madhouse? The alarming increase of insanity has become so noticeable within the last quarter of a century that many eminent men have devoted themselves assiduously to the discovery of the cause; and still the problem is partially unsolved, and the great army of lunatics is yearly augmented in this country alone by insane persons sufficient to fill a city.

Yet the asylums contain but a small portion of those whose minds are really disordered, and who can scarcely be considered perfectly sane. There are, unquestionably, many thousands of persons—borderliners, as an eminent nerve specialist has called them—outside of our asylums and insane hospitals, who are always hovering close upon the brink, full of idiosyncrasies, whims, and oddities, and ready to be driven,

by some slight circumstance, over the narrow line which divides them from the class of patients who are patently insane.

Depraved Appetites.—A father uses whisky and tobacco regularly, year after year, until the poisons become fairly ingrafted into his body, and enter into his physical constitution. Is it any wonder that his children take as naturally to the use of liquor and tobacco as a duck takes to water? Sometimes the appetite for these poisons is so strong that it is practically irresistible, and the poor victim, though much against his will and better impulses, is dragged down to a drunkard's grave, powerless to stem the tide which is sweeping him away to physical, mental, and moral destruction.

Libidinous Blood.—Sensuality, or sexual grossness, is also one of the recognized and most deplorable results of bad heredity. The sons of the dissolute monarchs of Europe followed in the footsteps of their fathers' laws, not more on account of the evil example before them than as the result of physical tendencies implanted within them by their sensual progenitors. Even the Bible affords examples of transmission of sensual tendencies from father to child through a long line of direct succession. The young man who, after attaining to years of maturity, becomes a rake, may perhaps be less responsible for his lapse from virtue than those from whom he received the immoral bias and bad physical proclivity.

A Way of Escape.—The victim of an evil inheritance need not despair, though he must struggle against obstacles which are planted in his very constitution.

There is a way of escape if he will avail himself of it. Let us consider what may be done to reverse the natural result of morbid tendencies:

1. The individual who has inherited morbid physical, mental, and moral tendencies, should acquaint himself with the real nature of his weakness, and earnestly set to work to fortify himself in that particular. If his parents have transmitted to him physical conditions which predispose him to consumption, let him carefully avoid every exciting and generating cause of that dread disease. While his body is still growing, let him pursue such a course of physical culture as will expand the chest, and develop the breathing powers to their fullest extent. Let him carefully avoid such exposures as are likely to produce catarrh, sore throat, cold on the lungs, etc. Let him carefully secure an ample supply of fresh air at all times. In the selection of a life occupation, let him avoid sedentary employments, such as bookkeeping, teaching, and other occupations which require confinement indoors, often in a vitiated atmosphere. Let him select some light but active muscular employment which will take him largely in the open air; and let him remember all through life that he has a weak point, that he cannot afford to run any of those risks of injury to his breathing organs which many others seem to incur with impunity. By this extra care, he may not only avoid the natural result of his constitutional tendency, but may so far eradicate it that in his children the weakness may be much less apparent, if not wholly obliterated; and by a similar course on the part of each successor in the line of descent, the evil heritage may at last be wholly wiped out.

In the same way, a scrofulous tendency may be kept in abeyance, and finally eradicated. A man whose heritage entitles him to lifelong suffering with scrofulous maladies of various characters and various degrees of loathsomeness, may, by scrupulous attention to all the laws of hygiene, by means of which his vitality may be re-enforced and his physical stamina established, go through a long lifetime without realizing the results of his morbid inheritance, and transmit to his children a better constitution than that which he himself inherited. Such a person should carefully avoid excesses of every description, particularly excesses and errors in diet.

The dietary should consist chiefly of fruits, grains, milk, eggs, and the better class of vegetables. Flesh food should be sparingly used, and gross animal fats should be wholly discarded from the dietary. An abundance of nourishing but simple food, such as may be easily digested and rapidly converted into good blood, should constitute the bill of fare of such an individual. Special attention should be given to cleanliness and exercise in the open air; and temperance and moderation in all things should be assiduously practiced by such an individual.

The young man who finds himself an inheritor of a weak digestion or sluggish liver should scrupulously avoid all those causes which are recognized as efficient producers of stomach and liver disorders. Simplicity in diet should be the rule of his life. The avoidance of sweets, fats, condiments, excesses in the use of animal food, and excessive eating, even of wholesome food, he should consider as binding upon him as the pre-

cepts of the moral law. He should lay down for himself the most rigid rules for the government of his dietetic practices, and religiously adhere to them. By this means, the digestion may gradually be made stronger, and even inherited dyspepsia finally outgrown.

The man whose inheritance is a weak nervous system, who has irritable or sensitive nerves, should at an early period in life set about caring for this part of his bodily organization by avoiding excesses of every sort. His stock of nerve force is low, and he must economize his expenditures in every possible manner. Extravagant drafts upon his nervous system should be most scrupulously avoided. By this means, he may hope to counteract the effect of the bad heritage, and save adding one more to the great army of sufferers from a wrecked nervous system, to be found in every civilized land. Such a person should above all cultivate evenness of temper, calmness of mind, coolness of judgment, and self-control. By the aid of such efforts as these, he may hope to keep at bay the multifarious foes which threaten to assail him in the guise of neurasthenia, or nervous exhaustion, and numerous forms of nerve disorders.

The man who knows that he is born with a mental drift toward the madhouse should industriously cultivate a bias in the opposite direction. Let him avoid excitements of every description. Let him hesitate long before undertaking any enterprise which demands severe and continued mental strain. Let him recollect that his physical machine has a weak spot in it, and that it must be run at a low pressure. He must learn

to be quiet, to go slow, to be moderate, to take the world easy, and to keep cool. Such a man may go through a long lifetime without a mental breakdown, by the use of proper precautions; whereas, if he neglects them, a sudden and unusual strain may at almost any time destroy his mental equilibrium, and send him to a lunatic asylum.

The Liquor Appetite.—A boy who is born with a natural taste for liquor or for the indulgence of other stimulants, should know that the natural liking for these poisons does not in the slightest degree lessen their injurious effects upon the body. The appetites themselves indicate a morbid condition of the nervous system, which, while it produces an intense craving for stimulants and narcotics, renders the system less able to withstand the deleterious effects which their use invariably produces. No man, no matter how strong his hereditary liking for stimulants, is absolutely compelled to resort to their use. If such a man will contend against the disposition with sufficient vigor, he may thoroughly master the morbid appetite; the conflict may be a bitter one, but one who makes an honest and persistent fight will be a victor in the end.

The youth who finds himself the unfortunate inheritor of strong and clamorous passions, which, unrestrained, will lead him down to physical and moral death, certainly has before him a physical and moral conflict, compared with which the bloodiest fight in ancient Roman days was but a playful game. By nature, he is destined to be an easy prey to the siren voice of the tempter. For such, One has said, "My grace is sufficient for you." A life of temperance,

sobriety, and purity will gradually subdue the evil demon; but if physical means fail, religion affords a source of never-failing strength to him who devoutly seeks its aid.

Thus it appears that even he who is heir to disease, infirmity, and vice may by persistent efforts escape the dire calamities which are the natural results of the physical bias of his constitution.

MAKE LIFE A SUCCESS

TOO many boys, possibly the majority, grow up to manhood, and allow themselves to drift on through life without any definite purpose to make a success of anything, and, indeed, without any very clearly defined idea of what success really is. It is not for this class that we are writing. This chapter would probably do such persons no good. This is written for the benefit of those young men who aspire to real success in life, and who desire to leave behind them some mark to indicate that they have not lived in vain.

What Is True Success?—First let us inquire, What is real success? One may answer, Success is to become the owner of a large farm well stocked with horses, cattle, and farm utensils, supplied with capacious barns, and ornamented by lawns and trees and a beautiful dwelling. In the estimation of another, the man who becomes the owner of a bank and has vaults filled with gold and silver and thousands at interest with good security, is the really successful man. Still another considers him most successful who becomes famous as a lawyer, an orator, or a politician who attains to some eminent position in the State, and whose name is in everybody's mouth.

They who succeed in these various ways may be looked upon in a certain sense as successful; but the

possession of lands, or gold, or fame, or a high position in society or in the State, cannot be considered as true success. Indeed, to fail in the effort to secure some ends which are considered essential to success, may be far more successful than to succeed. Success in all the directions mentioned may be attained by ways and methods by no means calculated to make a man happy in possession of that which he sought. For example, wealth is often obtained by dishonest means, by oppression, and by neglecting and ignoring the rights of others. Political honors are perhaps most frequently obtained by the employment of questionable means. Honor is often won by men who have secured it only by depriving others far more worthy than themselves of their lawful rights.

True success can never be realized by a man who seeks for success alone. A man who has before him no higher aim in life than simply to attain success, will not be likely to succeed in the truest sense. Such a man, being actuated chiefly or solely by ambition, will be almost certain to descend to the employment of means for the attainment of the desired end which are inconsistent with the character of one who truly succeeds.

True success is never sought for, but comes as the glorious reward of a life spent in devotion to duty, the steadfast adherence to true and noble principles which in their triumphal march carry with them all who have given to them their full and true allegiance. The man who thoroughly succeeds is he who finds his triumph in the victorious success of the principles to which he has attached himself. He may have endured.

hardships, braved dangers, and suffered persecutions; but all along he has stood steadfast for what his manhood and conscience taught him to be right and true, never thinking of success, but only of his duty, and is at last rewarded by finding himself elevated to the galaxy of heroes. He finds his triumph in the triumph of the glorious truths to which he has so steadfastly adhered.

All men are not so fortunate as to enjoy in this life the realization of what may be considered by the world as success; but all may yet feel that life has not been a failure, but has instead been in the highest degree successful, if they have sturdily adhered to true and genuine principles, and have earnestly fought against error, vice, and sin in every form.

It thus appears that a man who seems to be successful may not always in the truest sense have been such; while a man who seems to have made life a failure may in reality have made it a genuine success. Again we say, the man who will make life a great success will not be he who works and lives for success alone, but he who seeks with earnestness and true loyalty to do his duty, always and everywhere to stand up for truth and pure principles. Such a man will himself be loved and respected for the principles which he upholds, and elevated to the topmost round of the ladder of real and genuine success.

Have an Aim.—While the whole energies should not be devoted to the simple attainment of success, it is necessary that every person who desires to succeed in life should first of all possess some aim or purpose, some well-defined object toward which his efforts shall

be directed. A man without an aim is like a ship at sea bound for no port or country in particular, and with no rudder, or no helmsman at the wheel, at the mercy of the winds and waves, and liable to be driven upon shoals and rocks, or stranded upon some strange and desolate shore.

Singleness of purpose has been the characteristic of nearly every man who has made his mark in the world. Columbus, Napoleon, and Washington succeeded only through steadfast adherence to a single purpose, and the bending of every energy to the accomplishment of that object. It is of the greatest importance that the object, whatever it may be, shall be clearly defined. One who has simply a vague aim at something great, a vast mysterious something, without definite outline or substantial form, is like a desert traveler following a mirage, or a marksman shooting at a fog. The aim should be definite, distinct, and sharply outlined, and must be sufficiently elevated and noble to call out the highest and noblest efforts of which the individual is capable.

It must be premised, however, that the aim shall be one within the possible reach of the individual. Every man cannot be a president, a governor, or a silver-tongued orator; and it would be a misfortune if every boy or young man should build up in his imaginary future a presidential or a gubernatorial palace. Indeed, it is quite doubtful whether it is best for any one to start out in life with the distinct purpose of seeking political preferment or official position. The professional politician is almost necessarily a wire-puller—a purchaser of votes, and a purveyor of official

perquisites. No man of high and noble instincts can afford to devote his life to the business of running a political machine or manipulating caucuses. Let the general aim be to be a good citizen, a useful member of society, a genuine man, and as much more as circumstances and opportunity may permit.

Concentration of Purpose.—Having selected an object worthy of one's best efforts, let a man devote his whole energies to its attainment. Let him, with true singleness of purpose, seek by every legitimate means to secure the accomplishment of the purpose upon which he is determined. If patient, laborious preparation is required, let him unflinchingly devote himself to the work. If moral courage and mental firmness are the requisites, let him fortify his soul for the conflict. Let him not weaken his strength by dividing his energies among divers conflicting matters; in other words, do not try to grasp too much at once. In so doing he may fail entirely. The power of concentration is one of the most difficult attainments of all mental qualities. The ordinary mind is readily diverted by new scenes and objects of interest; but the mind which has undergone the discipline essential for the attainment of true success, fixes itself upon the single object with a grasp so firm that nothing but death can release its hold.

Perseverance.—We need not dwell upon the need of perseverance for the accomplishment of any great purpose. The great number of human beings whom we see all about us, who have failed to make life a success, have, in the great majority of instances, been driven from the road which leads to sure success by

the shifting winds of vacillation. Yet most of them have been once well started upon a promising road, but have been driven from the safe highway into the mazes and quagmires of uncertainty by some will-o'-the-wisp of great expectations, brilliant and alluring in the distance, but vanishing in thin air when just within hand reach. Nevertheless, a simple, plodding sort of dogged, unreasoning perseverance must not be considered a sure passport to success.

The old adage, "Let well enough alone," is probably quite as often misapplied as otherwise, as there are plenty of people who do not know what "well enough" is. Some are well content with the most meager measure of success; while others are never satisfied even with the most bountiful harvest or the most generous returns from their labors. And that other old adage, "A rolling stone gathers no moss," is equally liable to harmful application; for the man who stupidly pecks away all his life in a barren hole in the hillside, in the hope that he may strike a vein of rich ore if he perseveres long enough, is certainly no more likely to succeed than the one who hurriedly skims along the surface, turning up a clod here and overturning a rock there, but never stopping long enough in one place to discover the precious metal, even though it may have been hidden from his eyes by but the merest film of earth. If after an honest effort to succeed in any direction, the obstacles presented prove to be really insurmountable, better turn at once to something more promising than beat one's brains out against the dead wall of impossibility.

Thoroughness.—"Whatever is worth doing at all is worth doing well," is an old adage, the truth of which has never been denied, although now and then, it must be confessed, an apparent success may be obtained by the most imperfect and superficial work. In many respects, the American people are far inferior to those of some other nationalities in the execution of enterprises specially requiring the exhibition of this trait of character. The average American loves to accomplish the desired end by one supreme effort, by a grand, dashing display of his powers. The phlegmatic German, however, sits down to his task, quietly gathers about him the means by which it is to be accomplished, efficiently and methodically develops each feature of his work, and finally presents it a perfect and complete whole, symmetrical in all its particulars, and a model for all workers in the same line who may succeed him. Place the product of his genius alongside that of the brilliant, dashing worker. The contrast is that of a marble statue chiseled by a Carnova or a Michael Angelo, compared with one of the rude wooden images set up in the roadside chapels of an Italian highway.

Napoleon won his great battles by his thorough attention to all the little details of preparation. He anticipated every possible contingency, and was prepared for every emergency. So it is in the battle of life; the habit of giving earnest attention to details, of "taking pains," even in the doing of things seemingly of trivial importance, will often secure the prizes which the brilliant but haphazard and irregular efforts of others may fail to reach.

Yet it must be conceded that even this quality may be so greatly exaggerated as to become an impediment to progress, rather than an aid to success. The man who spends all his energies in elaborating and perfecting non-essential details, is like the man who busied himself in driving the cows out of his garden to save his cabbages, while his dwelling-house, with its valuable contents, was being consumed by fire.

Faithfulness.—Reliability, even in matters of small consequence in themselves, has often proved the stepping-stone to rapid advancement and business prosperity for young men who could boast no special talent, and possessed no special qualification for the place they were called upon to fill. Merchants, bankers, and business men of every rank are daily inquiring for young men who can be relied upon, and in whose hands important trusts may be reposed without danger that they will be betrayed. The want of this characteristic is what leads to the shameful defalcation of bank cashiers and presidents, and the general feeling of distrust and insecurity which has arisen from the great commercial panics growing out of the dishonesty of men in whose hands great pecuniary trusts have been placed. Any young man, no matter how meager may be his natural abilities, if he will improve his opportunities, may win for himself a useful and an honorable place in society by the unwavering cultivation of trustworthiness.

Be Practical.—Half the bad failures in life are due to a want of practical ability, of that combination of traits of character which enables a person to discriminate between useful things and those which are of

no consequence; between things of great import and those of trivial importance; to determine promptly what is best to be done in emergencies, and to be able to adapt one's self with readiness to changing circumstances. The visionary dreamer never succeeds, because his whole energies are devoted to the elaboration of schemes which can never be carried out, and which, if they could be, would be of little or no practical value to the world.

In the patent offices at Washington may be seen many thousands of ingenious mechanical devices, not one in a hundred of which has ever been put to any practical use, and never will be seen outside the rooms where they are stored for exhibition. Most of these are the result of days, months, and even years of labor on the part of men whose inventive faculties ought to have enabled them to render valuable service to their fellow-men; but which, unfortunately, not being balanced by the necessary qualities to render them of practical value, have been squandered in the invention and construction of machines for doing what nobody ever cares to have done, or what can be accomplished by much simpler and better means. Every neighborhood has its perpetual-motion maniac, who ought to serve as a living example to all to whom he is known, of the futility and folly of spending time and efforts in trying to accomplish impossibilities.

The term usually applied to practical ability is "common sense." Every one is supposed to have a share of common sense; but our experience with the world has led us to the belief that this is of all mental qualities the rarest, and would be more properly

termed "*un*common sense." Fortunately, it is a quality which can be developed, though the man must be considered fortunate indeed who inherits a large share of this element in his mental make-up. Persons who have common sense always reason about things. They never act without considering the why and wherefore of what they are about to do, and are continually inquiring the reasons for what they see transpiring about them. A large fund of common sense is of vastly more value to any man than the most finished course of instruction at a university; and one who is lacking in this essential quality will find that no amount of "book learning" is a substitute for it.

Learn by Experience.—All persons, even the wisest and most cautious of men, will sometimes make mistakes, but the wise man takes care that he does not frequently repeat the same error; while the man who is lacking in the quality which we have termed common sense, goes on committing the same blunder again and again, utterly regardless of the consequences which his experience has told him will invariably follow. A philosopher once said, "Experience keeps a dear school, but fools will learn in no other." Unfortunately, there are those who will not learn, even by experience. When we find that we have made a blunder, we should carefully consider the causes which have led to the calamity. When discovered, they should be carefully noted in our minds, and due care should be observed that we do not fall into the same error a second time.

Many things we may learn and must learn by personal experience. Some, perhaps, cannot be so well

learned in any other way; but life is too short to enable us to try every experiment possible, and we can ill afford to suffer the loss which would result by the constantly recurring blunders of a life wholly devoted to original experiment. Hence, it is wise for us to profit, as far as possible, by the experience of others whose lives may have fallen in the range of our observation. He is certainly a wise man who will appropriate to himself, as far as possible, the experience of his fellows and his predecessors; and, thus equipped, with the accumulated knowledge of the world, he will be able to accomplish vastly more and do his work far better than one who trusts simply to the uncertain results of his own individual experience.

Genius and Luck.—How often do we hear the remark, "He was a genius," "He was bound to succeed," or, "What a lucky man he was!" It is a mischievous popular error that genius and luck are the two magic influences which have enabled the majority of successful men to rise so far above their fellows in the particular lines in which they have attained eminence. It is not to be denied that some men are specially adapted for certain walks in life. Then it is certainly a matter of importance that each one should, if practicable, occupy the position to which he is best adapted, and in which he is most likely to succeed; but those who have given the greatest amount of study and thought to this question are unanimous in the opinion that the qualities which constitute genius are by no means uniformly extraordinary brilliancy of intellect, but far more commonly consist in an unusual ability and disposition for close and continual application. A man

of genius succeeds where another man fails, not simply because he has greater intellectual powers, but because he applies his mind to the subject which he has in hand with greater intensity, and pursues it with greater perseverance and more searching, penetrating thought than his unsuccessful colleague.

So with luck. So-called luck rarely consists simply in the occurrence of favorable circumstances; but far more frequently the secret consists in the fact that when the particular circumstance occurred, which was thought to bring the fortunate man luck, he was prepared to embrace the opportunity, and make the most of it, while his unsuccessful rival was engaged in a preliminary preparation without which he could not avail himself of the opportunity offered. The lucky man is not the man who, like "Micawber," is waiting listlessly for "something to turn up," but the man who is industriously preparing himself for anything that may turn up, and persistently working to turn something up whereby he may succeed in accomplishing the purposes at which he aims.

Promptness and Energy.—Whatever you undertake to do, put your whole soul into it. The world is full of half-hearted men,—men who are not quite certain whether they are wide awake or dreaming,—men who have latent energies sufficient to raise them to the loftiest heights of human greatness, but whose dull sensibilities allow them to lead lives scarcely higher in their aims and purposes, and little more effective in their results, than those of the dumb brutes, beside whom they toil in the fields and along the highways. It is easy enough to drop into this great army

of creeping human animals, whom the energetic but inhuman Napoleon pronounced "food for powder." He who aims at a higher and better life,—a life crowned by victories achieved and triumphs won,—must rouse every energy and summon every latent power within him, and plunge into the arena of life with an unfaltering determination to conquer something or die in the struggle. It requires no effort to float like a cork upon the tide of human life, or sink like a leaden weight beneath its surface; but to brave the seething flood and stem the mighty current, demands a stout heart and a steady nerve.

Economy.—A man who has reached forty years of age and has not acquired a competency, that is, has not laid up an amount sufficient to provide himself and family with the necessaries and comforts of life, with a balance in store for emergencies and illness, has either been a victim of serious and unusual misfortunes, or he has been a spendthrift or a sloven. The amount of wealth which a healthy man is able to accumulate each year is sufficient to amount, in twenty years, to a sum large enough to pay for a comfortable home, besides covering the expenses of living, even though the individual is able to earn only the wages of a common laborer. In a vast number of instances, poverty is the result, not of misfortune, but of unthriftiness. We frequently see poor persons who are very industrious in their habits and who command good wages, and yet are always in poverty. These persons, as well as others who have an abundance of wealth, are almost invariably spendthrifts of time, money, and health. All of these are valuable possessions, which

we should treasure with care. Time is valuable, because it is equivalent to money. If not uselessly spent, it may be employed in such a manner as will produce something for the good of the individual or for the benefit of the world; hence it is our duty to spend our time in such a way as will enable us to accomplish the most for ourselves and for others. The waste of time is one of the most common of all squanderings. So often we hear an individual say, "My time is my own; I can do as I please with it;" but we are responsible for our time. Each moment should be profitably employed, not necessarily in working always, but in such a manner that it will in some way result in value to ourselves or to some one else.

Money is often wasted in the purchase of things which we really do not require. Probably three-fourths of all our expenditures are not absolutely needed for either health or comfort. We spend most of our money for luxuries which do us harm rather than good, and thus occasion a double waste.

Lastly, we mention the waste of health, which is a far more serious matter than the simple waste of money. Money squandered may frequently, by painstaking effort, be regained. Health squandered can in many cases never be fully restored. The waste of health is one of the most inexcusable of all wastes. For a few moments' pleasure in the harmful indulgence of appetites or passions, we receive in exchange hours, days, months, years, a lifetime of misery and suffering. Health is one of the choicest of our possessions, one of the most essential to the enjoyment of all our other faculties and blessings; hence it should be highly prized and carefully guarded.

True Merit Wins.—We meet people every day who are complaining that the world does not appreciate them. Their friends fail to recognize their abilities, according to their view of the matter, and they are not afforded the opportunity for displaying their talents which they deem they ought to have. These persons have been very truly called "chronic grumblers." The merits which they possess, as a rule, are present in their own imagination alone. If they have any special ability, their anxiety that they should be appreciated and recognized so disgusts those with whom they come in contact as to prevent such a recognition. If, after giving the world a fair chance to form a judgment of our abilities, we find no recognition of the special claims to distinction on our part, we should feel pretty well convinced that we have been duped by our own self-complaisance, and that we have no such extraordinary merit as we had come to believe. In the long run, and in the majority of instances, the world puts a man where he belongs. If a man has true merit, some person or some circumstance will find him out, and bring him to the front. He has only to bide his time, patiently developing his talents and enlarging his resources; and when the proper time comes, he may depend upon it there will be a place for him. Nothing affords a more unpleasant spectacle to people of common sense than a man of meager abilities elbowing his way through the world, running hither and thither, proclaiming to the world his talents, and begging that he may be recognized, and that room may be made for him in some position for which he imagines he is peculiarly fitted. The world is naturally,

and very properly, suspicious of such persons, and they should not take it hard if they are now and then severely snubbed. It usually takes a large amount of snubbing to convince these pretentious and pompous blusterers that there is an essential difference between "brass" and brains, or that a man may have a great amount of "cheek" with very little intrinsic merit.

Self-Respect.—Few traits of character are more repugnant to the refined and cultivated taste, and more opposed to genuine good sense, than overweening conceit, or self-esteem; but self-respect is a quality of character which excites respect in others, and it may be said that the amount of respect ordinarily accorded an individual will be largely in proportion to his own respect of himself. Self-respect and conceit are two very different traits of character. Conceit leads an individual to think himself to be something more than he is. In his own estimation, his qualities are exaggerated to a degree often positively ludicrous. Self-respect, on the other hand, leads a person to fairly estimate his own qualities, rather underrating them than otherwise, but leads to a knowledge of his own qualifications and real merits; and his genuineness of purpose and self-reliance will constitute the most essential elements of his success. Without self-respect and a degree of confidence in one's abilities, one's course in life is apt to be cowardly and vacillating. A healthy self-confidence is one which is the result of a thorough recognition of the thing to be attained, of the means and efforts required for its attainment, and the consciousness of an honest and thorough preparation for the undertaking.

Self-respect is one of the most powerful incentives to virtue and purity of life. That was a noble reply made by the lad who was tempted by another to commit a wrong act by the plea, "No one will know it," "But, sir, I shall know it myself." The consciousness and self-condemnation of wrong-doing is to a man with self-respect a very powerful protection from it. Cultivate self-respect by avoiding most carefully every act or thought which lowers your own esteem of yourself when you sit in judgment upon your own heart and life, and in so doing you will make yourself worthy of the esteem and respect of others, and you can depend upon it that your true value will be in due time appreciated.

Genuine Gentility.—Last, but not least, we mention, as an essential element of real success, the character and the manners of the true gentleman. We do not propose to lay down specific rules for conduct, but to urge the importance of cultivating civility and courtesy of manner toward others. The boy who is gentle and kind of heart, no matter how rough his exterior, will be regarded by those with whom he comes in contact, with kindly feeling, which is always inspired by real purity and genuineness of character. The place for a boy to begin to cultivate true courtesy and gentleness of manner is at home. Respectful deportment toward his parents, kind and gentle treatment of his brothers and sisters, and a courteous manner toward all, under all circumstances, if assiduously cultivated at home, will establish a charm of manner which will accompany the individual through his entire life, and will constitute a very important element in leading

him to that success which a person who adopts these suggestions, most highly deserves. A man whose manner is suave and affable, makes friends even of his enemies, and at once disarms prejudice by the evidences which his outward manner gives of real gentleness of heart. A fawning sycophancy of manner is wholly unworthy of any one who claims to be a gentleman; but real courtesy is always becoming in all persons and under all circumstances.

Boys are apt to think that while they should be courteous to strangers, with their relatives and friends, and especially their schoolmates and "chums," they may neglect the little courtesies and civilities which they would promptly accord to a stranger. This is a very great mistake. This very neglect often leads to the destruction of friendships which have existed for years, and might have been lifelong, and frequently gives rise to hardness and even bitter enmity. Besides, in order that one should possess that grace and charm of manner which a true gentleman exhibits, he must keep in constant practice, by treating all his associates with the same kindness and civility with which he would treat them if meeting them for the first time as strangers, upon whom he might wish to make a favorable impression.

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